[Master thesis Sustainable Development]

Coping with catastrophes:

A study of crop insurances from the perspective of small farmers in India

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Coping with catastrophes:
A study of crop insurances from the perspective of small farmers in India

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Key concepts

Climate Change • Weather shocks • Adaptation • Smallholder farmers • Risk management • Crop insurance • Vulnerability

Abstract

Small farmers are one of the hardest hit groups in the world that is affected by the negative consequences of a changing climate. Their absolute dependence on weather conditions makes them extremely vulnerable. A catastrophe can be as small as rains arriving too soon or too late in the season; destroying a harvest and trapping farmers into poverty. Over the last two decades, micro insurances have become more popular as risk management instrument and are offered to marginalised communities to build resilience at relatively affordable rates. Successful implementation of agricultural micro insurances throughout the world is still limited however. The country with the most experience, and that has even included these insurances in national policies, is India. With over three quarters of its farming population cultivating on less than 2 hectares of land (and thus falling in the category of small farmers) and being home to a wide range of climatic risks and conditions, this country is incredibly interesting and relevant to study regarding risk management for climate change in general and crop insurance in particular. However, crop insurances in India also face several challenges (such as basis risk, delays in payments and lack of awareness among farmers). Therefore, the following research question is central to this study:

How can current crop insurances in India be improved to better suit the needs and wishes of small farmers?

To answer this question, a literature review was conducted in combination with an in depth field survey in Nashik district in Maharashtra and focus group discussions in Vellore District in Tamil Nadu. The field survey revealed that community involvement in insurance plays an important role for farmers. The most extensive case of community insurance has been implemented in Tamil Nadu. To gain a better understanding how community insurance can then be implemented and improved, farmers revealed their satisfaction under this type of insurance. Not surprisingly, community involvement helps strengthen trust in crop insurance products, gives farmers autonomy over their own risk management, and increases awareness and understanding of crop insurance. While insurance companies in India are increasingly using advanced technology to estimate losses, this thesis can serve as a case study for community empowerment as the strongest weapon in climate change adaptation. By shedding light on small farmers under various types of insurances, it becomes clear which aspects of the different designs and implementation strategies are truly satisfying small farmers' needs.

Acknowledgements

First of all, I want to thank all the farmers that participated in my case studies. The fact that they gave a peak into their lives and were willing to talk about sensitive issues, was essential for my research. Although I had studied the situation of farmers in India in academic literature and policy documents, the field work confronted me with the problems these farmers face and their need for solutions. Their patience and generosity are extra motivation to keep on working in this field.

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Conversions

Units of measurement

1 lakh	**100,000**
1 crore (100 lakh)	**10 million**
1 hectare (ha)	**10,000 m2**
1 acre	**4,047 m2**

Effective exchange rate (May, 2014)

€1	**83.60 INR**
INR 1	**€0.012**

Acronyms & abbreviations

AICI	Agricultural Insurance Company of India
CAI	Catastrophic Agricultural Insurance
CCE	Crop Cutting Experiments
CCIS	Comprehensive Crop Insurance Scheme
CGAP	Consultative Group to Assist the Poor
CRMG	World Bank Commodity Risk Management Group
FAO	Food and Agriculture Organisation
FGD	Focus Group Discussion
FONDEN	National Fund for Natural Disasters
GDP	Gross Domestic Product
GIC	General Insurance Corporation of India
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit
GRM	Municipalized Risk Group
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
MFI	Microfinance Institution
mNAIS	Modified National Agricultural Insurance Scheme
MRFC	Malawi Rural Finance Corporation
NABARD	National Bank for Agriculture and Rural Development
NAIS	National Agricultural Insurance Scheme
NASFAM	National Smallholder Farmers' Association of Malawi
NGO	Non-governmental Organisation
OIBM	Opportunity International Bank of Malawi
PACC	Fund to Assist Rural Populations Affected by Weather Contingencies
PCIS	Pilot Crop Insurance Scheme
PTTS	Programa Troca-Troca de Sementes
SECO	Swiss Secretariat for Economic Affairs
TERI	The Energy and Resources Institute
WB	World Bank
WBCIS	Weather Based Crop Insurance Scheme

1. Introduction

1.1 Context and urgency

Global climate change is altering the earth's ecosystem: weather patterns are changing, extreme weather events are becoming more frequent, and sea levels are rising. Worldwide, climate change has both biophysical as well as socio-economic effects that influence agricultural production (Kalisch et al. 2011). Due to the dependence on natural resources, agriculture is highly vulnerable to climate change and the resulting changing weather patterns: weather-related disasters like drought and floods largely outnumber geophysical disasters (Collier et al. 2009; Barrett et al. 2007). Climate risks for the agricultural sector include temperature shifts, erratic rainfall and droughts (Kalisch et al. 2011). These changing environmental conditions imply that farmers need to adapt to ensure their livelihoods (Collier et al. 2009). However, the uncertainty of increasing climate risks makes especially farmers with a limited budget less likely to invest in for example buildings, improved seeds, fertilizers and herds, pursuing a risk averse strategy (Barrett et al. 2007).

Agriculture plays an important role in India's economy: it is a source of livelihood for almost 60 per cent of the population (Kalisch et al. 2011). The value added of agriculture to the GDP of India is almost 20 per cent, and 60 per cent of the land area is used for agriculture. The country has the largest area under wheat, rice and cotton and is the largest producer in the world of milk, pulses and spices (The World Bank, 2013). Small and marginal farmers can be considered the most vulnerable group in the agricultural sector facing climate risks. Due to limited access to formal risk management instruments, these farmers often apply informal instruments to prevent and cope with weather related risks. Examples of coping strategies in response to a weather shock are withdrawing children from school, reduction of nutrient intake and distress sales of assets (Barrett et al. 2007). As sensitivity to climate risk declines with increasing wealth it is important that risk management strategies in the agricultural sector focus on policies and instruments that are particularly beneficial for small and marginal farmers (Hertel & Rosch, 2010). Thus, risk management is of importance in relation to climate change in the agricultural sector, as it helps realising higher levels of socio-economic development by providing buffers for farmers, households and communities to become more resilient to these risks (Someshwar, 2008).

India's National Mission for Sustainable Agriculture is one of the country's eight missions under the National Action Plan on Climate Change. One of the four focus areas of the National Mission for Sustainable Agriculture is risk management, in which agricultural and weather insurance mechanisms play an important role (Kalisch et al. 2011). Micro-insurances are considered to be a useful tool to enhance risk management capacity: they could provide more economic security in times of need. Micro-insurances can be defined as follows (CGAP in NABARD, 2008, p.96):

> '*The protection of low income households against specific perils in exchange for premium payments proportionate to the likelihood and cost of the risk involved*.'

Thus, the main difference with regular insurance is that micro-insurances are targeting low-income clients with an affordable premium cover (Hochrainer et al. 2009). India has integrated two different models of agricultural insurance in national policy: the Weather Based Crop Insurance Scheme (WBCIS) and the National Agricultural Insurance Scheme (NAIS). The first one consists of a weather index-based insurance that links the insurance to the data of weather stations in a certain area (for

example rainfall or temperature data). NAIS consists of an area-yield index insurance, which links the insurance to yield data in a certain area (for example through historic yield data of that particular area). Although the agricultural micro insurance market in India is considerable (especially in comparison to other developing countries), there is still a large group of farmers that is not reached, or not aware of the insurance products. Therefore, it is important to understand agricultural micro insurances in the broader context of climate risk management from the perspective of the farmers themselves. Hence, the following objective and research questions are central to this research:

Main objective:
To understand the merits, demerits and find points for improvement of existing crop insurances in India

Central research question:
How can current crop insurances in India be improved to better suit the needs and wishes of small farmers?

Sub questions:

1. What kind of crop insurance systems do farmers in India use and why is there a difference in uptake?
2. Does current crop insurance meet the needs and wishes of small farmers?
3. What are the merits and demerits of current crop insurance?

The following definitions will be used in this thesis. Marginal farmers are those who cultivate less than one hectare of land (2.5 acres), whereas farmers who cultivate between one and two hectares of land (2.5-5 acres) are considered small farmers (FAO, 2010). In India, farmers cultivating less than two hectares of land make up 80 per cent of the farming population (FAO, 2010). In this thesis we will thus refer to small farmers, as those who cultivate up to two hectares of land.

1.2 Scientific relevance

Although there is a wide range of literature on micro insurances, the implementation of the instrument in developing countries is rather recent. As India can be perceived as one of the countries with the largest application of agricultural micro insurances, including in national policies, it is interesting to conduct research in this country. By including farmer's motivations and their experienced benefits, the data will contribute as a case study of agricultural micro insurances as well as be used as input for further research or improvement of risk management instruments. It will also provide a broader perspective towards agricultural micro insurances in India, by including both insured and non-insured farmers in different parts of the country. The study will give insight in farmer understanding, awareness and satisfaction of agricultural micro insurance as a risk management instrument trying to shield farmers against the negative consequences of climate change.

1.3 Social relevance

Small farmers are the most vulnerable group in the agricultural sector. The majority of these farmers are subsistence farmers and only sell their products if they have enough excess harvest beyond their households basic needs. This also implies that a failed harvest or a low yield due to changing weather patterns can have disastrous consequences for this particular group. In the future, dry spells will

become longer, extreme precipitation will increase and weather events will intensify. This implies that small farmers are facing a poverty trap they cannot escape. Risk management instruments are therefore crucial to stabilise their income. This research will give insight in how risk management for these farmers can be improved, which could lead to improving of (government and insurance) policies and can provide a small step into improving the livelihoods of small farmers in India and hopefully provides a useful case study for other developing countries as well.

1.4 Structure of the thesis

Part 1: Literature review

Chapter 2 introduces the main theoretical concepts central to this research: the sustainable livelihoods framework, risk management, and concepts related to crop insurance (such as moral hazard, risk pooling, and adverse selection). The chapter also introduces the conceptual framework of the thesis in *section 2.2*. Chapter 3 explains risk management in general and gives an overview of risk management strategies applied by small farmers. *Chapter 4.1* provides an overview of agricultural micro insurance around the world. *Section 3.3* then explains how crop insurance in India have evolved through the years. *Chapter 5* provides a literature review of two types of current crop insurance in India: area-yield and weather index based insurances. The main opportunities, challenges, and scope for improvement found in academic literature are revealed and were used as input for the field survey.

Part 2: Methodology & research area

Chapter 6 gives an overview of the research question, the research objective, and the methods used. It explains how the literature review is conducted and gives insight in the data analysis, using sub objectives and sub research questions, as well as hypotheses and variables. A combination of qualitative and quantitative data is used, which both ask for a different analytical approach. *Chapter 7* shows the research areas, and the specific vulnerabilities farmers experience in this part of the country.

Part 3: Results: case study 1 & case study 2

Case study 1 covers chapter 8-11:

Chapter 8 gives the regional profile of Maharashtra and Nashik district. After which *chapter 9* explains crop insurances available in Maharashtra in more detail and looks at the differences between the three categories of farmers used for the field study. *Chapter 10* examines the risks these farmers face and their perception of these risks, as well as looking different aspects of crop insurance (loss assessment, premium, the role of insurance companies) and the importance farmers give to these aspects. *Chapter 11* both shows the rating farmers give to aspects of crop insurance and shows the SWOT analysis that was based on the literature review and field survey combined.

Case study 2 covers chapter 12-14:

Chapter 12 gives the regional profile of Tamil Nadu, as well as giving insight in the weather pattern in Vellore district and the main crops grown. Chapter 13 explain the concept of community insurance and why this particular design was chosen by DHAN Foundation. Chapter 14 then uses the data gathered in FGDs to reveal the satisfaction levels on different aspects of the insurance of farmers in the area.

Part 4: Discussion, conclusion and recommendations

The final part consist of the discussion in *chapter 15*, which discusses the relevance of the thesis results in the broader climate change debate. The final *chapter 16* gives the conclusion and the policy and research recommendations of this thesis.

2. Theoretical background

2.1 The Sustainable Livelihoods Approach

This research will built on the **Sustainable Livelihoods Approach**, which takes a holistic approach towards development, especially focused on rural people (IFAD, 2013). This research will be approached from the sustainable livelihood definition of Chambers and Conway (1991, p.6):

> *'A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term.'*

The focus of this research is the ability of smallholder farmers to cope with weather-related shocks and stresses that will only be increasing due to climate change. The production risks arising from climate change that smallholder farmers are facing cannot be completely eliminated but they can be reduced and managed.

A holistic approach is necessary, as for small and marginal farmers the entire household works together to provide for income. And often this is not limited to one crop (intercropping is very common) and also not only limited to agriculture, but also non-agricultural on-farm labour (e.g. Agarbatti making and Beedi rolling) and off-farm labour (agricultural, non-agricultural and in government projects). How the rural households cope depends on their context: for example the shocks they face (these could be weather shocks) and their cultural background (in some villages migrant labour is very common, while in other places it is not very acceptable). The centre of the framework are the people, which suits the current study very well, as the perspective of the farmers is considered the most important (and often forgotten) aspect of improving smallholder risk management. It is very important to bear in mind that the adaptive capacity of households and individuals is dependent on various factors. When a small or marginal farmer withdraws its children from school for example, this could be due to a failed crop, which leads to not being able to pay off a loan, and therefore not being able to pay school fees anymore, and/ or needing the children to go to work instead of school to contribute to the household income. The Sustainable Livelihoods Framework portrays these links in a simplified manner, but nonetheless gives an important overview of the complexity of relations between context and livelihoods of rural people (in this case small and marginal farmers and their household). The focus for this research will be on the livelihood outcomes and strategies (the right side of the model), whereas the left side will function as background knowledge in comparing different farmers.

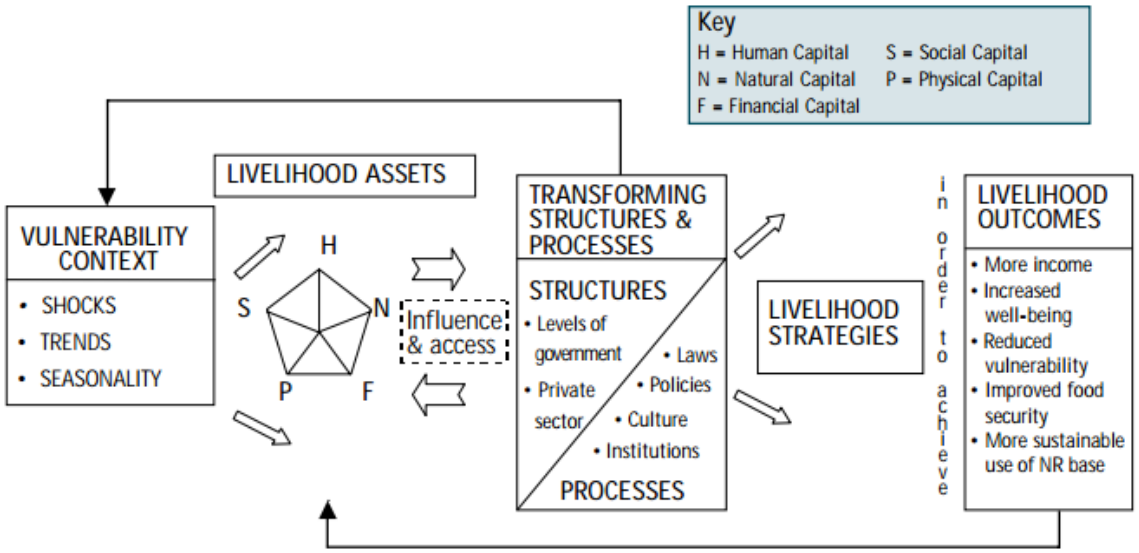

Figure 2.1: Sustainable Livelihoods Framework (Retrieved from DFID, 1999)

2.2 Conceptual framework

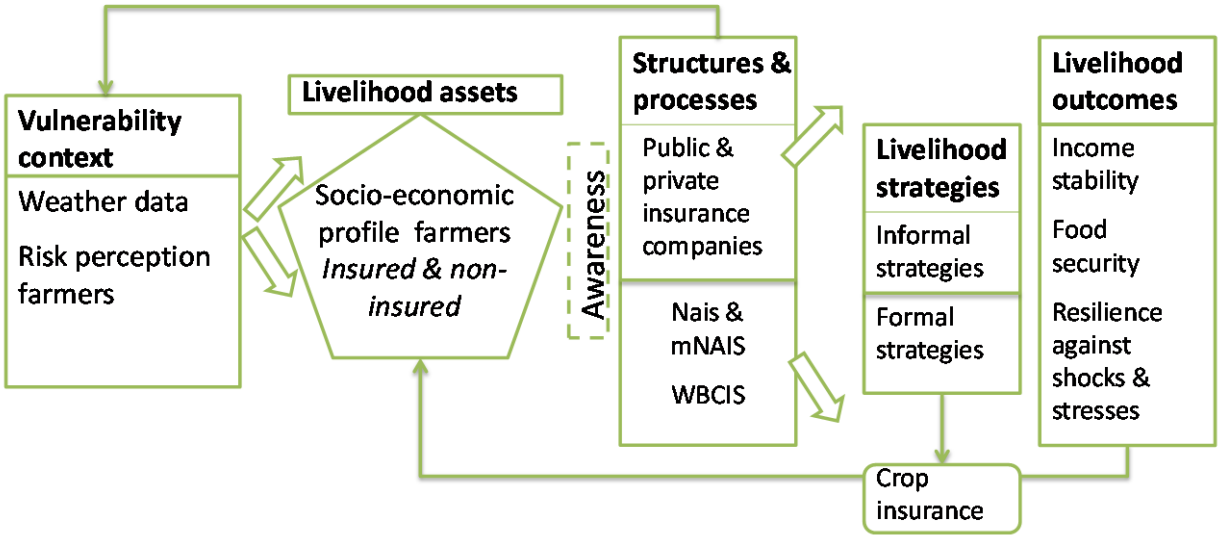

Figure 2.2: Conceptual framework

Figure 2.2 shows the conceptual framework of the current research, based on the Sustainable Livelihoods Framework. The first three pillars (vulnerability context, livelihood assets, and structures and processes) function as background information on the area, the farmers, and the policies and insurance schemes that are in place. The awareness farmers have of crop insurance and agriculture in general is used to distinguish understanding farmers within both insured and non-insured groups of farmers. Categorisation of farmers is of importance as it later on influences the choices they make for their risk management strategy, and is expected to differ between socio-economic position of the

farmers. The fourth pillar (livelihood strategies) also plays an important role in the research. Although the main risk management instrument under study is crop insurance, it is important to place this tool within the formal and informal risk strategies farmers apply to determine the role of insurance in the overall risk management of these farmers. The fifth pillar (livelihood outcomes) provides insight into the context of risk management strategies among various farmers.

3. Agricultural risk management

3.1 Risk management explained

Risk management is of importance in relation to climate change in the agricultural sector, as it helps realising higher levels of socio-economic development by providing buffers for farmers and helps households and communities to become more resilient to these risks (Someshwar, 2008). When looking at the people affected, two types of risk can be distinguished: idiosyncratic risk and covariate risk. **Idiosyncratic risk** is specific to a household whereas a **covariate risk** affects all members of a community or region (e.g. droughts) (NABARD, 2008). In both situations it is uncertainty that can lead to a risk situation with negative consequences (Zweifel & Eisen, 2012, pp.1-2). Although households often have various ways of insuring themselves against idiosyncratic risks (e.g. borrowing from neighbours or family members), in case of covariate risks, the options of informal insurance are more limited as the entire region is affected (Hochrainer et al. 2009). With regards to outcome, there are also two types of risk: **speculative risk** and **pure risk**. Outcomes of the former type of risk can produce are: loss, no loss/no gain and gain, whereas the latter type of risk can only result in loss or no loss (AICPA, 2004). Weather shocks fall under the latter category of risks. One tool of managing pure risks is insurance (Government of India, 2007).

Especially for small farmers without any buffer to fall back on, these risks can create poverty traps. In relation to poverty traps, three types of climate and weather risk management categories can be distinguished (Barrett et al. 2007; see also figure 3.1):

- *Safety nets for emergency humanitarian response:* blocking people falling below threshold A.
- *Cargo net interventions and facilitating exit from chronic poverty:* stimulating upward movement from point 1 to point 2, lifting people over the threshold B.
- *Safety nets for preventing collapse into a poverty trap (or productive safety nets):* blocking downwards movement from point 2 lower than threshold B.

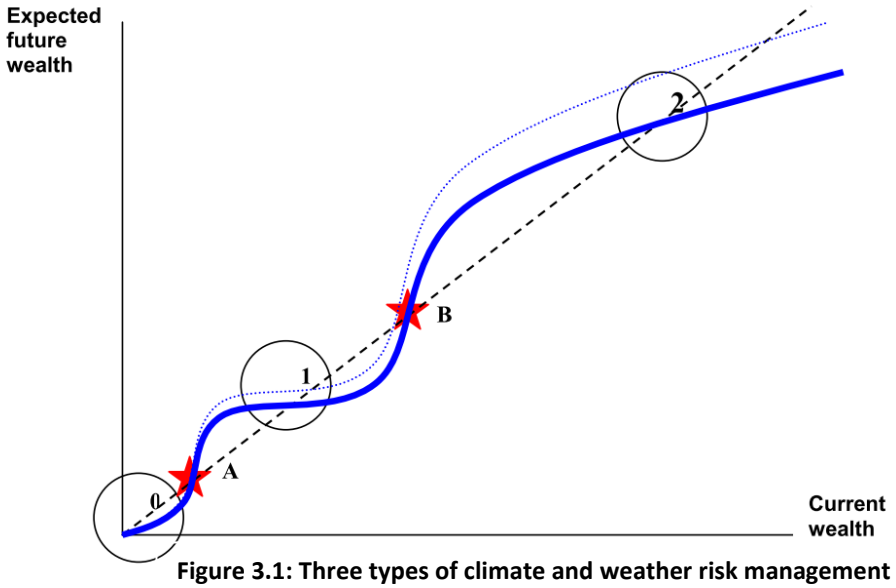

Figure 3.1: Three types of climate and weather risk management
(Retrieved from Barrett et al. 2007, p.25)

Agricultural micro insurances fall under the third category of risk management, as they provide a safety net on the longer term, preventing small and marginal farmers from falling into poverty. Crop insurances can be considered as formal risk management instrument. The difference between formal and informal risk management instruments is as follows (according to The World Bank, 2001, p.140):

- **Informal strategies** are defined as
  "..arrangements that involve individuals or households or such groups as communities or villages.."
- **Formal arrangements** are defined as:
  "..market-based activities and publicly provided mechanisms.."

A further distinction can be made between ex ante and ex post risk management strategies. This classification focuses on the point in time in which the reaction to risk takes place: **ex ante:** prior to the occurrence of the potential risk; **ex post:** after the event has occurred .

3.2 Risk management strategies applied by small farmers

Based on talking to farmers[1] about their risk management strategies, both informal and formal strategies are distinguished. See table 3.1 for an overview of formal and informal, ex post and ex ante risk management strategies.

3.2.1 Informal risk management strategies

Ex-ante informal strategies are characterised by diversification of income sources and choice of agricultural production strategy. These include:

- **Diversification of income**
  In addition to their main crop cultivation, majority of the farmers supplement their income from additional income from livestock rearing, migrant labour abroad (e.g. Quwait, Singapore, Malaysia) and local labour (e.g. bakery, electrician). The farmers are also involved in incense stick making, bidi (cigarette) making and matchbox making (work that is conducted on the farm) alongside crop cultivation .
- **Crop diversification**
  Farmers have diversified their arable land to grow other crops alongside their main crop (e.g. ragi, horse gram, cotton, paddy, horticulture, mushrooms, tomatoes, brinjal, grapes, garden bean).
- **Diversification towards plantation crops**
  Some relatively bigger farmers have diversified their arable land towards plantation crops (such as teak wood, mango, banana, coconut).
- **Inter-cropping**
  Farmers in the study area are intercropping groundnut cultivation with other crops (e.g. green gram, black gram, red gram, fodder sorghum, little millet, field bean).
- **Adoption of advanced cropping technique**
  Some of the advanced cropping techniques used by farmers are: compost heap, gypsum and complex (if there is moisture in the soil) and potassium.
- **Groundwater irrigation**
  Although majority of small farmers depend on rain for, some farmers use and have access to tube wells and bore wells to irrigate their land.

[1] 300 groundnut farmers in Tamil Nadu in focus group discussions, see methods section 6.2.3

Ex-post informal strategies are characterized typically by reducing consumption pattern, deferring/ low key social and family function, sale of assets, mutual aid or reallocation of labour resources to off-farm or on-farm labour activities. Some of these on-farm and off-farm risk mitigation practices are effective for counterbalancing the consequences of events affecting only some members of the community, it does not work well in cases of covariate income shocks (Hazell, 1992).

3.2.2 Formal risk management strategies

Government action plays an important role in agricultural risk management both ex-ante and ex-post. In the area[2] where farmers were asked about their risk management strategies, small farmers have access to services provided by a local NGO (DHAN Foundation). The formal risk management strategies farmers apply include:

- **Diversification of income**
  Farmers are supplementing their income by taking part in a government provided rural employment scheme. In 2005, the central government formulated the National Rural Employment Guarantee Act (MGNREGA). MGNREGA provides employment to those who demand it: at least 100 days in a financial year of guaranteed unskilled wage employment for adult members of rural households to provide in their livelihood (Ministry of Rural Development, 2012)
- **Supply of inputs**
  The local NGO provides to its members quality red gram and groundnut seeds at appropriate time as well as gypsum at market rate. Supply of quality agricultural inputs help reduce risk of procuring fake or low-quality inputs from the market.
- **Risk pooling**
  The government of India insures groundnut farmers by its NAIS scheme while DHAN Foundation pools risks by insuring their members through its mutual crop insurance scheme.
- **Infrastructure & advanced cropping techniques**
  The local NGO promotes tank fed irrigation, and land levelling and silt application amongst its farmers as advanced cropping techniques.

Ex-post formal strategies include government provided social assistance schemes (e.g. rice, education, health care). In addition, farmers can avail credit from government or DHAN Foundation.

[2] Vellore district, Tamil Nadu

Table 3.1: Risk management strategies small farmers (based on Vellore district, Tamil Nadu)

			Informal Mechanisms		Formal Mechanisms	
					DHAN foundation	Publicly provided
Ex ante strategies	Diversification of Income	Livestock-Cattle, Sheep, Chicken, Bidiwork, Incense stick making, Matchbox making Migrant labour abroad Migrant Labour Locally	Diversification of Income			MNREGA
	Crop Diversification	Ragi, Horse Gram, Cotton, Paddy, Horticulture, Mushrooms, Tomatoes, Brinjal, Grapes, Garden Bean	Supply of Inputs		Supply of Redgram and Groundnut seeds Supply of Gypsum at market rate	
	Diversification towards tree Plantations	Teak wood, Mango, Banana, Coconut	Infrastructure		Promote tank fed Irrigation	
	Inter-cropping	Green Gram, Black Gram, Red Gram, Fodder Sorghum, Little Millet, Field Bean				
	Advanced cropping techniques	Compost Heap, Gypsum and Complex (if there is moisture in the soil), Potassium,	Advanced cropping techniques		Land levelling, Silt Application	
	Ground water Irrigation	Tube wells, bore wells	Risk Pooling		Insurance (community based crop insurance)	NAIS-Groundnut
Ex post strategies	Coping with Shocks	Reduced consumption pattern, deferred/ low key social and family function, sale of assets, mutual aid	Coping with Shocks		Credit (at 18% interest rate: market rate is 12%, 6 % for organisation→ flows back to SHG)	Social Assistance 1) Rice scheme 16kg rice per month (3 member family) 20kg Rice per month (more than 3 member family) 35 kg Rice per month (BPL families) 2) 2 Sari/Dhoti per year 3) Free Education in Government Schools, 4) Free Treatment in Government Hospital
	Diversification of Income	Migrant labour abroad -Kuwait, Muscat, Singapore, Malaysia Migrant Labour Locally(Mason work, bakery, electrician, hotel etc)-Chennai, Bangalore				

3.3 The concept of insurance explained

In general, insurance consists of a contract ('insurance policy') between an individual or organisation (the insured) and an insurance company (the insurer). In exchange for bearing the risk, the insured is obliged to pay a risk premium to the insurance company. Risks of different clients are then pooled; a claim made to the insurer will be paid from this pool: hence, this is called **risk pooling**. If the insurer wants to protect itself against not being able to pay all the claims made from the pool (for example in case of a drought when a lot of people will make a claim at the same time), the insurer can take on an insurance for the insurance, which is then called **reinsurance**. **Adverse selection** occurs when potential insured clients hide information about their risk from insurers. This information asymmetry then leads to false assessments and premia and in the end failing of the insurance system (Barrett et al. 2007). **Moral hazard** occurs when insured clients resort to actions that increase their exposure to the risk they have insurance for, thus exceeding the risk exposure that was estimated when the premium was established, leaving the insurer with a higher risk (Barrett et al. 2007; Davies et al.2009).

The poor not only face more risk than others, it is often their low capacity to cope with risks that makes them extra vulnerable (NABARD, 2008). Micro-insurances can therefore provide a useful tool to enhance risk management capacity: it provides more economic security in times of need. Micro-insurances can be defined as follows (CGAP in NABARD, 2008, p.96):

> '*The protection of low income households against specific perils in exchange for premium payments proportionate to the likelihood and cost of the risk involved*.'

Thus, the main difference with regular insurance is that micro-insurances are targeting low-income clients against an affordable premium cover (Hochrainer et al. 2009).

The lack of formal, risk transfer instruments makes the poor more vulnerable and averse to making risky and uncertain investment decisions. By stabilising farmer income and therewith increasing risk taking capability, agricultural insurance facilitates adoption of higher yielding technologies and intensification of production. Also, insurance serves as a substitute for physical collateral and reduces credit default risk to financial intermediaries financing agricultural production.

4. Scope for crop insurance around the world

4.1 Agricultural insurance around the world

To provide insight in micro-insurances around the globe, several case studies are presented below. These cases are of insurances in developing or transition countries, as this is most relevant to the current research, and gives an overview of the benefits and challenges of micro-insurances as they are experienced in practice. In a lot of developing countries, crop insurance for smallholder farmers are solely based on a small pilot study and very few (academic) literature can be found. This also implies that although the cases below are selected on the basis of their relevance and on the basis of including a diverse range of cases, the amount of literature found did play a role in selection of case studies.

4.1.1 Credit & rainfall index insurance: Malawi

In 2005, an index-based insurance for smallholder groundnut farmers was introduced (Meze-Hausken et al. 2009). The loan package was provided to groups of farmers that are organised through the National Smallholder Farmers' Association of Malawi (NASFAM) by the banks Opportunity International Bank of Malawi (OIBM) and Malawi Rural Finance Corporation (MRFC) and the umbrella organisation of nine insurance companies Insurance Association of Malawi (IAM) (Hochrainer et al. 2009; Mahul & Stutley, 2010). Technical assistance for the scheme was provided by the World Bank (WB) and the Swiss Secretariat for Economic Affairs (SECO) (Hochrainer et al. 2009). The trigger is based on rainfall data (or a water requirement satisfaction index), which uses the rainfall over a 130-days growing period with individual weight to 10-days rainfall (decadal) periods (Meze-Hausken et al. 2009). In the scheme, the farmers take-up a loan with a higher premium rate to include the insurance: in case of drought (below the rainfall trigger) the farmer only pays a fraction of the loan due and the insurer pays the rest directly to the bank (Hochrainer et al. 2009). This means that the bank has the assurance that the loan will be paid off, and is more likely to provide a loan to low-income farmers than would be the case without the insurance (Hochrainer et al. 2009). To minimise the basis risk, robust groundnut development data were used to let the pay-out trigger match the actual loss as much as possible (Meze-Hausken et al. 2009). In 2007 the insurance scheme was extended to also include Tobacco farmers (Mahul & Stutley, 2010). In one of the conclusions in their study on the Malawi scheme, Meze-Hausken et al. (2009) argue that pooling together of insurance schemes and sites within a country could result in significant savings in capital requirement.

4.1.2 Disaster index (re-)insurance: Mexico

In Mexico, the federal governments provide funds to local governments in case of disaster, as part of the National Fund for Natural Disasters (FONDEN) that was created in 1995 (González, 2009). As part of this programme, the Fund to Assist Rural Populations Affected by Weather Contingencies (PACC) was put into place in 2003 to assist smallholder farmers with weather-related shocks: smallholder farmers are assisted in case of extreme weather events through a 70 per cent contribution of the federal government and a 30 per cent contribution of the local government (González, 2009). However, uncertainty about these events makes it difficult to predict when smallholder farmers will need the assistance, which in some years has led to relocating of the funds to other programmes (González, 2009). In response to this uncertainty, the national (state-owned) insurance institution

AGROASEMEX (national reinsurance company) has created Catastrophic Agricultural Insurance (CAI) for smallholder farmers affected by adverse weather conditions (Mahul & Stutley, 2010; González, 2009). There are two triggers for pay-out: excess rainfall (corn, sorghum) and drought (corn, bean, barley, sorghum) (Hazell et al. 2010). The insurance functions as reinsurance mechanism, in which the federal and local governments are the one buying the insurance and in case of drought or excess rainfall can pay disaster relief to affected farmers, without increasing the fund's budget (González, 2009). Farmers are, on average, reinvesting 70 per cent of the pay-out improving their production (Hazell et al. 2010).

Basis risk has occurred on a couple of occasions, both where pay-out was made without damage and where farmers were affected but no pay-out was available (Hazell et al. 2010). Decreasing this risk would imply that more infrastructure is necessary (having farmers within the 10-20km range of weather station), but also brings along costs for governments beyond their budgets (Hazell et al. 2010). Hazell et al. (2010) suggest the cooperation with a private company (Fundación PRODUCE) that already has more weather stations in place. Although these stations lack historical data, AGROASEMEX has developed reanalysis techniques to simulate series of weather variables (into regular patterns). Often, farmers are also unaware that the aid they are receiving is part of an index insurance programme as opposed to the disaster relief out of tax revenues (Hazell et al 2010). On the positive side, the index insurance programme has been less costly for governments than paying disaster relief directly to farmers (Hazell et al. 2010).

4.1.3 Rainfall and temperature index insurance: Ukraine

In Ukraine, a hybrid of multi-peril crop insurance and area-yield index insurance has been introduced in 2001 (Hazell et al. 2010). In 2005, a pilot was launched to introduce rainfall and temperature index insurance. A partnership was formed consisting of the International Finance Corporation (IFC) Agribusiness Development Project and World Bank Commodity Risk Management Group (CRMG) and the only insurance company willing and suitable to cooperate (Hazell et al. 2010; Shynkarenko, 2007). One of the main pitfalls of the pilot programme was the lack of government support. As the government did support (50 % of the premium) the hybrid crop insurance of area-yield and multi-peril crop insurance, insurance companies lacked the incentive to implement a weather index-based insurance, although these insurance could be more effective (Shynkarenko, 2007). Another weakness was the fact that agricultural insurance is not common in Ukraine (banks prefer to use collateral to secure loans instead of insurances) in combination with the short and rather poor marketing campaign (Hazell et al. 2010; Shynkarenko, 2007). There was a lack of experience and a lack of cooperation with farmers, which resulted in only 2 farmers willing to sign a rainfall index insurance contract. On top of this, infrastructure for weather data is insufficient (distance between weather stations are more than 50 km) and the availability of weather data is restricted by the high costs to access it (Hazell et al. 2010).

4.1.4 Area-yield index insurance: Brazil

The state government in Brazil implemented a programme for seed-swapping in the late 1980s: Programa Troca-Troca de Sementes (PTTS). The programme aims at smallholder farmers of which the majority of (total family) income comes from agriculture (>70 per cent), and provides these farmers with certified maize seeds they pay at the end of the harvest. As extreme weather events were threatening the existence of PTTS, an area-yield index insurance was included in the programme in Rio Grande do Sul State in 2001, under the name of Municipalized Risk Group (GRM) (Hazell et al.

2010). The insurance is only for PTTS farmers and pay-out is triggered when the yield deviation of the average yield in an area is more than 20 per cent (Hazell et al. 2010). Under the coordination of AgroBrasil Seguros a partnership was formed with the State's Department of Agriculture and Supply (SAA), the State Bank of Rio Grande do Sul (Banrisul) and the State Data-Processing Company (PROCERGS) (Hazell et al. 2010).

The main constraint of the programme is its high dependency on government, the state for funding (reducing the sustainability of the programme) and the national government for pay-outs (which results in a delay of an entire harvest crop season) (Hazell et al. 2010). The dependence on the government subsidies also resulted in the programme not being renewed after 2008 (Mahul & Stutley, 2010; The World Bank, 2010). One of the strong points of the programme in Brazil was its extensive education and marketing efforts: because of the voluntary basis of the insurance, 45 people worked on marketing activities, and a cartoon booklet was produced to educate farmers to understand the product (Hazell et al. 2010). Technology was also used to improve the insurance data. A software programme ' AgroNet' was developed that cross-checks farmers' requests for seed with data of the municipality (for example the sum insured and area-yield data of a the farmers' municipality); a daily report is distributed to Agrobrasil, insurers, reinsurers and the sales team on the ground (Hazell et al.2010).

4.1.5 Failed attempt: Morocco

In Morocco, the government launched a yield insurance scheme in 1995: Programme Secheresse (or Drought Programme), with revisions made to the scheme in 1999 an area-yield based mechanisms was included for the lowest of three different coverage levels (the three different levels are: 1000, 2000, 3000 Moroccan Dirhams (MAD) per hectare) (Stoppa & Hess, 2003). For the first level (of 1000 MAD/ha), payment is triggered on the basis of area-yield data, whereas the two other levels (2000 MAD/ha and 3000 MAD/ha) require individual farm assessment (Stoppa & Hess, 2003). An official ministerial drought declaration is needed for all levels, and the yield-loss for the first level this is based on realised area yield data for a rural commune (Skees et al., 2001). The programme is subsidised by the government with a premium subsidy of 50 per cent (Mahul & Stutley, 2010). However, the programme suffered from different problems, including high costs, loss adjustment, adverse selection, moral hazard and fraud (Skees et al.2007). Therefore, in the beginning of the 2000s, The World Bank (in cooperation with the Moroccan government) attempted to introduce rainfall index insurances in Morocco and conducted an elaborate study (Skees et al., 2001; Skees et al. 2007). The project failed (close to implementation) and the product was not implemented. Lybbert et al. (2010, p.178) suggest this was in part because '*the recent downward trend in rainfall hinted at a troubling non-stationarity in precipitation data*.' Based on this information, the insurance company proposed a high premium which could not be passed on to the clients (Skees et al. 2007).

Table 4.1: Overview of index insurance case studies around the world

Country	Type of insurance	Since	Delivered by	Amount insured	Role of government	Re-insurance	Linked to credit
Malawi	Rainfall index insurance	2005	Banks: OIBM & MRFC Insurer: IAM Farmers: NASFAM TA: WB & SECO	2005: 900 farmers US$ 35,000 2006: 3000 farmers US$ 110,000[3]	None (no subsidy or government support)	No	Compulsory for smallholder farmer taking loan
Mexico	Disaster index insurance	2003	Disaster relief: federal & local government Reinsurer: AGROASEMEX	2006: Sum insured US$131.9 million[4] 2007: 650,000 farmers[5] 2008: 800,000 farmers[6]	Agricultural reinsurance through AGROASEMEX Catastrophe insurance protection for smallholder farmers: 100% subsidised	Yes	No
Ukraine	Rainfall and temperature index insurance	2005	Insurer: Credo-Classic Partnership with: IFC & CRMG	2005: 2 farmers	None (only subsidy support for the other agricultural insurance)	No	No
Brazil	Area-yield index insurance	2001	Insurer: PROAGRO Partnership: SAA, Banrisul, PROCERGS, AgroBrasil Seguros	2007: 26,071 farmers 2008: 14,893 farmers[7]	Subsidised and initiated by government (Subsidy: 90% of premium)	Yes	No

4.2 History of crop insurance in India

India can be perceived as the birthplace of weather index based insurance (and particularly a frontrunner among developing countries), considering that as early as 1920 there was already a proposal for agricultural insurances done by Chakravarti (Clarke et al. 2012). He emphasised the need for a package of insurances (including buildings, cattle, granaries, and agricultural implements) and proposes a crop insurance scheme based on a rainfall deficits throughout India (Mishra, 1995). This scheme was based on payments in case rainfall during a season was less than a given threshold

[3] Hochrainer et al. 2009, p.237
[4] González, 2009, p.2
[5] Hazell et al. 2010
[6] Hazell et al. 2010
[7] Uptake increased after bad crop years with large amounts of pay-out, and decreased in good crop years (without pay-out) (Hazell et al.2010)

(Clarke et al. 2012). Although Chakravarti's plan was never implemented, it still serves as the basis of crop insurance in India today. In 1947 (the year of independence) the need for crop insurance in India was also recognised by the government (Singh, 2004). In 1947-1948 a commission was set up to research the possibilities of crop insurance. One of the main questions that needed to be addressed was how to assess loss: either a Homogeneous Area Approach or an Individual Approach (Singh, 2010). The first one assesses loss on the basis of the yield for an entire area, whereas the latter assesses loss on the basis of a farmer's own yield and loss experience (and pays indemnities accordingly) (Singh, 2010).

In 1965 the national government introduced a crop insurance bill, which it circulated to state governments for their views on it. However, the bill was rejected by all state governments on the ground that the financial obligations were considered to be too high (Singh, 2010). This resulted in further investigation in the administrative, economic and financial implications of various crop insurance types (Singh, 2010). Different experiments with crop insurances started from then onwards (AICI, s.a.). The main milestones in crop insurance in India over the years are:

- **1972-1978: Individual farm based crop insurance experiments**
  From 1972 onwards, several experiments with crop insurance started. The insurance was on an individual base, but all experiments suffered financial losses (AICI, s.a.). In total 3110 farmers were insured under the schemes, paying INR 454.000 in premiums in total. However, the total claim amount far exceeded this number: INR 3.79 million (GIZ, 2013).

- **1979- 1984: Pilot Crop Insurance Scheme (PCIS)**
  In 1979 the General Insurance Corporation of India (GIC) started operated the PCIS in 13 states of India. Insurance participation was for loanee farmers and on a voluntary base covering cereals, millets, oilseeds, cotton, potato, gram and barley (AICI, s.a.). The scheme was based on an area approach and covered a total of 627.000 farmers, paying a total of INR 19.695.000 against a claim amount of INR 15.705.000 (Singh, 2010). The risk was shared on a 2:1 basis between GIC and state governments, and a subsidy (provided by the state governments) of 50 per cent of the premium amount was available for small and marginal farmers (GIZ, 2013).

- **1985-1999:Comprehensive Crop Insurance Scheme (CCIS)**
  In 1985 the national government introduced CCIS as a replacement of PCIS. State governments could choose to either opt in or out of the insurance scheme (Singh, 2010).
  The indemnity payments were based on a homogeneous area approach using Crop Cutting Experiments (CCE) to determine yield. However, most states were not able to conduct the required 16 CCE per area, and pooled together the yields of different areas with the same conditions (such as cropping pattern, climate, soil, et cetera) (Singh, 2004).

- **1999: National Agricultural Insurance Scheme (NAIS)**
  As successor of the CCIS, the NAIS was introduced by the national government in 1999.

Again, states can choose whether or not to participate in NAIS. If a state participates, insurance for food crops, oilseeds, and selected commercial crops is mandatory for farmers borrowing an agricultural loan, and voluntary for non-borrowing farmers (Clarke et al. 2012). The insurance is written against the average yield of a certain region or district, and when the yield in this region falls below a certain threshold, payments are made (Hazell, 2001). Claims beyond 100 per cent of the premiums collected are shared between national and state basis, each baring half of this risk (Agricultural Finance Corporation Ltd, 2012). See table 4.2 for NAIS coverage in the seasons 2007-08 to 2009-10.

Table 4.2: Coverage of NAIS in India

Crops	Area Covered (%)	Claims/ Premium ratio	Premium/Sum assured (%)	Claims/Sum assured (%)	Farmers Benefited/ Farmers Covered (%)	Sum assured as % of Value of Crop Output
2007-08						
Paddy	18.21	3.87	2.43	9.41	15.55	9.81
Wheat	13.20	5.96	1.51	9.00	28.01	17.43
Groundnut	51.59	0.19	3.47	0.66	2.52	4.38
Potato	31.08	0.89	4.61	4.09	15.77	10.75
Cotton	3.77	0.03	7.61	0.24	0.80	69.00
2008-09						
Paddy	14.91	5.11	2.37	12.14	25.22	9.88
Wheat	13.99	3.19	1.52	4.83	16.84	13.83
Groundnut	52.98	9.06	3.47	31.45	53.26	3.23
Potato	21.16	4.35	7.39	32.17	78.87	6.60
Cotton	4.99	0.10	10.22	0.98	6.77	49.20
2009-10						
Paddy	26.02	3.79	2.47	9.36	31.73	5.12
Wheat	12.30	1.39	1.50	2.08	16.41	17.00
Groundnut	69.88	6.99	3.48	24.36	59.90	1.87
Potato	13.87	0.13	7.67	1.00	3.93	8.10
Cotton	5.53	0.58	7.28	4.20	15.04	27.08

(Retrieved from: National Centre for Agricultural Economics and Policy Research (NCAP), 2011, p.13)

- **2003: First weather index insurance**

  The first weather insurance product was introduced in India in 2003 by a private insurance company (ICICI-Lombard) (Clarke et al. 2012). This project started with a small pilot in Andhra Pradesh and was launched more broadly in 2005 (Francisco, 2008; Davies et al. 2009). Two other companies followed ICICI Lombard: IFFCO-Tokyo (private) and the Agricultural Insurance Company of India (AICI) (public) (Skees et al. 2007).

- **2007: Weather Based Crop Insurance Scheme (WBCIS)**

  The Weather Based Crop Insurance Scheme (WBCIS) is the pilot scheme that was launched by the Indian national government in 2007. The introduction of a new scheme expanded the choice for states: not only could they opt in or out of NAIS, they now were offered the option to make a choice between NAIS and WBCIS (Clarke et al. 2012). In the agricultural year 2010-2011 the WBCIS policies included over 9 million farmers covering risk valued at 3.17 billion US dollars and with a total premium value of 258 million US dollars (Clarke et al. 2012). Pay-out is made when rainfall falls below (drought) or above (excess rainfall) a certain threshold

(Angove & Tande, 2011). See table 4.3 for an overview of the development of WBCIS in India from 2003 onwards.

Table 4.3: Weather-based index insurance in India (Retrieved from Clarke et al. 2012)

Agricultural year	Farmers insured	Sum Insured (USD millions)	Commercial premium volume (USD millions)	Claims paid (USD millions)	Claim payments as multiple of commercial premiums
2003-04	1,000		<0.1	<0.1[2]	
2004-05	11,300		0.2	0.1[2]	
2005-06	112,500		1.6	0.2[2]	
2006-07	181,900		1.6	1.0[2]	
2007-08[3]	678,425	398	33.1	23.9	72%
2008-09[3]	375,100	208	18.6	14.2	77%
2009-10[3]	2,278,407	1,093	99.9	62.0	62%
2010-11[3]	9,278,000	3,174	258.9	125.0	48%

Note:

1. Commercial premium includes both farmer premium and government premium subsidies
2. Kharif season only
3. WBCIS only

- **2010: Modified National Agriculture Insurance Scheme (mNAIS)**

  In 2004, the Joint Working Group and the World Bank proposed modifications to NAIS to overcome the main weaknesses, these modifications included: to change the governments financial liability into up-front subsidy on premiums, reducing the unit size to village level, and early part payment to farmers based on weather indices (The World Bank, 2011). On the basis of this study, modifications were incorporated in the NAIS scheme in 2010 (Mahul et al. 2012).

5. Current crop insurance in India: a literature review

To gain a better understanding of existing crop insurances in India and find the caveats in scientific knowledge, a literature review was conducted. The review is intended to give a broad overview of the literature on existing crop insurances in India and will be used as building block for the field research for the current study.

There is a broad range of studies, varying from peer-reviewed academic articles to policy papers, and ranging from micro field studies to macro (country-level) analyses. The content and opinions expressed in these studies vary widely, from very positive towards crop insurances to more critical stances. Therefore the current study will focus on the lessons learned, as this would be useful for the upcoming field work. Refer to appendix 2 for the extended table of the review of literature using four categories of analysis (objective, main observations, conclusions, scope for future research).

The main observations may be classified as challenges and opportunities of existing crop insurance in India. To compare the results of the studies on the different types of insurances, the two main existing agricultural insurance types in India were chosen to be analysed: weather index insurance and area-yield insurance (see table 5.1. for a concise overview of the comparison). There are several studies (e.g. Cappiello et al.2012; Nair, 2010; Rao, 2010; Lilleor et al. 2005) that evaluate NAIS insurance and propose weather index Insurance as more effective alternative for smallholder farmers. However, there are also studies (e.g. Rao, 2010; Zant, 2008) that propose combining area yield insurance and weather index insurance, to use the advantages of both insurance types while overcoming the challenges these risk management strategies face. None of the studies completely dismisses crop insurance as a risk management strategy, although multiple studies (e.g. Manuamorn, 2007; Hess, 2003; Pal & Modal, 2010) underline the importance of an integrated livelihood perspective, in which insurance is part of a broader risk management package.

There are several challenges that both types of insurance are facing. The main concern that was mentioned in the majority of studies for weather insurance (e.g. Cappiello et al.2012; Clarke et al. 2012; Nair, 2010) and area yield insurance (e.g. Panda,2013; Rao, 2010) is basis risk. This occurs when the outcome for the insurance is not in line with the outcome for the farmer: a farmer experiences a loss without pay-out or vice versa. For weather index insurance this is mainly due to the poor density of weather stations and the lack of real time weather data (Panda, 2013; Cappiello et al.2012; Pal & Modal, 2010; Rao, 2010; Raju & Chand, 2008). For area yield insurance this could be ascribed to the inefficiency of crop yield estimation, which implies that the area estimation differs from the actual yield of the individual farmer (Cappiello et al.2012). Furthermore, both types of insurance are considered to face delays in payment, although for NAIS there was more agreement between the different studies (e.g. Panda, 2013; Cappiello et al.2012; Nair, 2010) on this topic, whereas for WBCIS there are conflicting results (the study of Panda (2013) considers delays an obstacle for WBCIS whereas the study of Clarke et al. (2012) and Giné et al. (2008) found quick settlement an opportunity for WBCIS). This could be due to the differences in availability of weather data and infrastructure in the different areas under study. The main difference in costs of the two insurance models is that weather index insurance needs relatively high start-up costs (i.e. weather stations) (Nair, 2010; Raju & Chand, 2008), whereas yield area insurance does not face a high initial investment, but faces high administrative and transaction costs throughout the provision of the insurance (Panda, 2013; Rao, 2010; Raju & Chand, 2008). Another difference between the two types

of crop insurance is that for area yield insurance information asymmetry problems (moral hazard and adverse selection) are considered to be a major obstacle (Cappiello et al.2012; Pal & Modal, 2010), while one main advantage of weather index insurance is that these types of problems are considered to be reduced (Clarke et al. 2012; Rao, 2010; Giné et al. 2008; Raju & Chand, 2008).

Table 5.1: Challenges, opportunities and scope for improvement weather index and area yield insurance

	Weather index insurance	Area yield insurance
Main challenges	Basis risk	Basis risk
	Infrastructure: lack of real time weather data	Inefficiency in crop yield estimation
	Delay in payment indemnities	Delay in settlement indemnities
	High start-up costs	Large manpower & transaction costs
	Reliance on historical data	Moral hazard & adverse selection
	Complex contract index design	Limited coverage (only production risks are covered)
Main opportunities	Lower moral hazard & adverse selection	Available for all crops where yield data is available
	Quick claim settlement	Combines individual and area approach
	Low transaction costs (no field visits or yield estimation)	Relatively low start-up costs
Scope for improvement	Investment in weather stations	Simplified procedure
	Raising awareness among farmers	Wide publicity for creating awareness
	Wider coverage (pre-sowing & post-harvest)	
	Reduce insurance unit	
	Combining different insurance products	
	Risk packaging; integrated risk management strategy (insurance as part of broader strategy)	

Several studies refer to the role of the government in insurance provision. The study of Clarke et al. (2012) explicitly mentions consumer protection, and the need to enhance legislation that protects the costumers in availing insurance products. The study of Zant (2008) also ascribes insurance market failure to the lack of effective legal systems to enforce insurance contracts. Furthermore, in the study of Goudappa et al. (2012) the creation of a separate Crop Insurance Wing within the Agriculture Department is proposed to overcome constraints of the scheme, whereas the study of Nair (2010) focuses more on mistrust farmers have towards insurance companies and believes that making weather stations government owned would increase the trust of the farmers in the insurance product. In India, there are both public and private companies that provide crop insurances. A solution towards having more private companies participating in the micro crop insurance market, while still ensuring consumer protection, could be to stimulate public-private partnerships (Raju & Chand, 2008). As early as 1980, the study of Biswanger already underlined the importance of policies that are focused on removing external constraints of farmers instead of being risk-specific.

One of the main problems with both insurance types that is external to the design of the product, is the lack of awareness among farmers. Lack of understanding of the concept of insurance is one of the main reasons for the low uptake among non-borrowing farmers (Giné et al. 2008) and also makes farmer's preference go out to cash reserves and savings when compared to insurance, as they often feel this is the safer choice (less of a gamble) (Soni & Trivedi, 2013). Several studies (e.g. Cappiello et

al. 2012) explicitly mentioned that the majority of insured farmers are still borrowing farmers (and thus the ones who have a mandatory agricultural insurance). One option of creating awareness among farmers is by lowering the insurance unit to a level closer to the farmer (e.g. Gram Panchayat) (Nair, 2010; Pal & Modal, 2010; Raju & Chand, 2008) and using insurance agents at the village level (Goudappa et al. 2012). The studies of Soni & Trivedi (2013) and Lilleor et al. (2005) also mention that self-help groups can play an important role in provision of crop insurances and raising awareness among farmers.

For the current study it is useful to look at the scope for further research proposed by the different studies under review. One of the main suggestions for further research is to study how non-loanee farmers can be included and informed about the insurance schemes (e.g. Cappiello et al. 2012; Goudappa et al. 2012; Raju & Chand, 2008). The majority of insured farmers acquire an agricultural loan to which the insurance is linked. This implies that most of the insured farmers are involuntarily insured, and there is still a large group of farmers that are not aware of insurance (i.e. non-loanee farmers). To understand the awareness level of different types of farmers, it is important to compare both insured and non-insured farmers in this thesis. By analysing the insurances through the perspectives of small farmers, their needs and wishes will be uncovered. With these insights, crop insurances and risk management for small farmers in India can be further improved which is helpful in making these farmers more resilient against the negative effects of climate change.

6. Methodology

6.1 Objective & research question

Main objective

To understand the merits, demerits and find points for improvement of existing crop insurances in India.

Central research question

How can current crop insurances in India be improved to better suit the needs and wishes of small farmers?

6.2 Methods & techniques

6.2.1 Literature review

A literature review was conducted on specific literature of existing crop insurances in India. This review was used as input for the field work under the current study. The articles used were chosen for the relevance of the topic and the selection is based on including a variety of scholars and backgrounds. The review is intended to give a broad overview of the literature on existing crop insurances in India, and does not suggest to include all articles available on this particular topic.

The main objective of the review was to find gaps in knowledge and scope for future research, as well as analyzing the different views on various types of agricultural insurance in India. The articles were analysed on the basis of four main categories:

- **Objective** (& type of insurance): what is the main objective of the article? And what type of insurances are discussed?
- **Main observations**: What are considered the main challenges and opportunities for the insurance types discussed?
- **Conclusions**: main point of the article (major improvements of the insurance models or recommendations)?
- **Scope for future research**: suggestions for further research and possible knowledge gaps.

6.2.2 Field survey

For primary data collection a survey was distributed to small and marginal farmers. The main goal of this method is to gain more insight in the understanding of farmers in insurance and revealing the merits and demerits of crop insurance. As well as gaining insight in the aspects of crop insurance that need to be improved to better suit farmers' needs and wishes. The survey was conducted in cooperation with GIZ India, as part of their agricultural insurance project for the Agricultural Insurance Company India (AICI). The survey was designed in consultation with GIZ, and therefore a limited number of questions have been left out of the analysis as they were less relevant for the current research. Appendix 3 shows the field survey. The following number of surveys were conducted in Nashik district, Maharashtra:

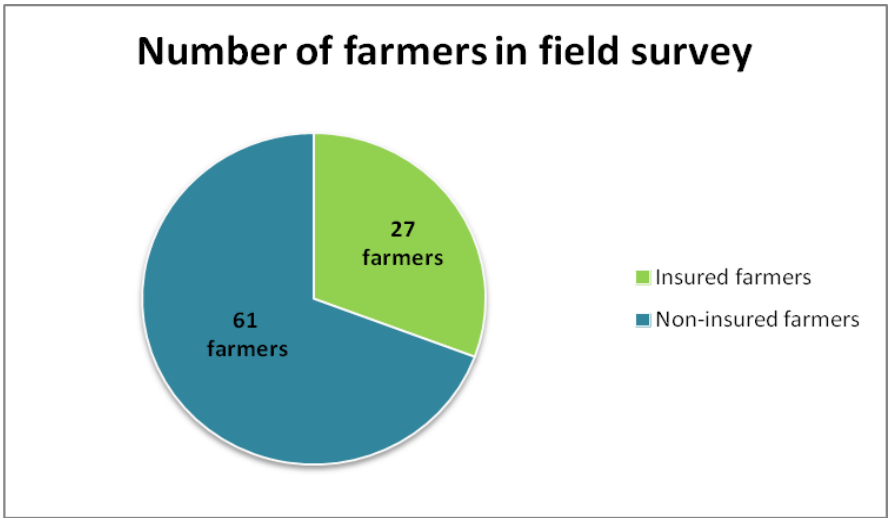

Figure 6.1: Number of farmers in case study, divided in insured and non-insured farmer groups

6.2.3 Focus group discussions

To understand, evaluate, and gain feedback on the existing community based insurance programme focus group discussion (FGDs) were conducted. 298 farmers were (randomly) selected by DHAN Foundation in 8 FGDs that were held in two different blocks of Vellore district: Nattrampalli and Gudiyatam. In Nattrampalli the first six FGDs were held and in Gudiyatam two FGDs took place (of which FGD7 was a combination of two communities). Majority of the farmers were groundnut cultivators but there were a few farmers who did not cultivate groundnut. Also, a large share of the farmers in the FGDs were women as groundnut cultivation in this region is primarily done by female farmers. The groups of farmers consisted of smallholder farmers (less than two hectares) and included both insured and non-insured farmers. In total, 102 insured farmers were present in the FGDs. In these sessions, insured farmers were first asked to state the amount of land they owned, the amount under groundnut cultivation (and the amount insured), other crops that are grown and other means of living they have. Non-insured farmers were also asked to explain the reasons for not insuring their crop.

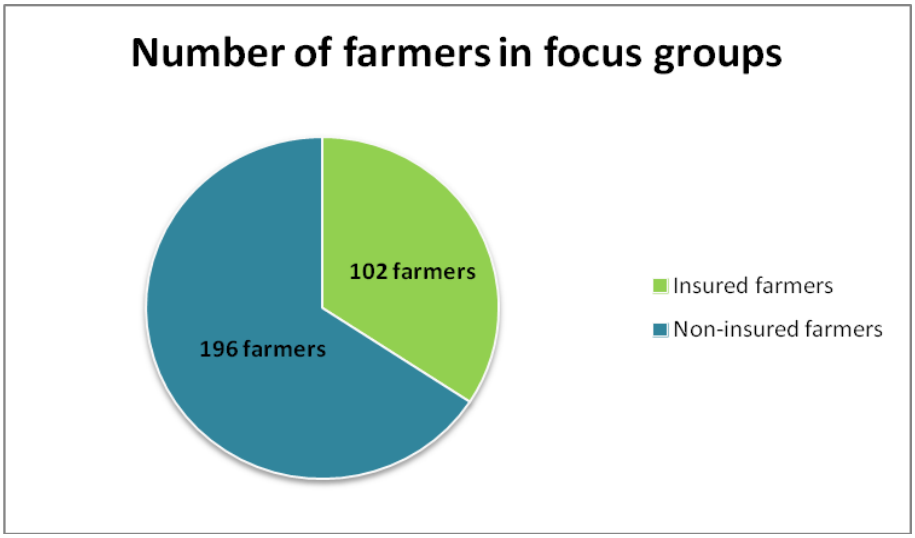

Figure 6.2: Number of farmers in Focus Group Discussions, divided in insured and non-insured farmers

6.2.4 Satisfaction game

In the FGDs a game that was played was conducted with only insured farmers under the community insurance. On the basis of literature, nine elements are distinguished to measure the satisfaction level of farmers insured under the groundnut community scheme, which are displayed in table 6.1.

Table 6.1: Nine indicators to measure satisfaction level of farmers

Indicator	Reason for including Indicator
Premium amount paid	To view whether or not the premium level is acceptable in relation to weather related risks farmers face
Number of days to claim payment	The number of days to claim payment can determine the effectiveness of the insurance in stabilisation of farm income. Especially in groundnut cultivation, where the seeds for next season are one of the major costs, timely pay-out is important to ensure that farmers have the opportunity to timely purchase their inputs for next season
Yield assessment process	Yield assessment is done on individual basis through the mutual insurance committee. This element measures the satisfaction of farmers with this assessment process
Insurance as risk strategy	Enquiring whether or not the mutual groundnut insurance covers the main risks farmers face in groundnut cultivation
Level of benefit payment	This indicator was added to view if the claim payment covers the actual loss of the farmers
Association with fellow members in the community	As the community structure is the main element that makes this insurance type different from other crop insurances, it is important to know how the satisfaction is towards the other members in the community
Way in which members were included in product design (Inclusiveness)	This indicator was included to gauge if farmers feel involved in designing stages of the product
Selection of members in assessment process	Members of the MIC are selected by the representatives of the SHGS, which are chosen by the members of the community. This aspect asked for the satisfaction of farmers towards the selection of members for the assessment committee
Grievance Redress Mechanism	If farmers are unhappy about any of the above mentions elements, do they feel satisfied with the mechanism and structure in place through which they can voice their grievances?

For this game three colours of tokens were used (green for satisfied, blue for neutral, and red for dissatisfied). Nine rounds were played in which each indicator was evaluated by the farmers by putting their token in a pouch. To gain more insight in the reasons for dissatisfaction of farmers the amount of tokens were calculated on the spot. After all indicators were evaluated, farmers were asked to state reasons for dissatisfaction for indicators that scored a majority of red tokens.

6.2.5 Semi-structured interviews

To gain better understanding of crop insurances in India four semi-structured interviews were held. Two were held in the early stages of the research: one with the micro insurance association of the Netherlands (MIAN) to gain broader understanding of micro insurances around the world, the advantages and disadvantages, and to hear the experiences of field experts; and one with a scholar to understand the merits and demerits from a expert working on micro insurances. One interview was held with a human rights advocate and scholar in New Delhi to gain insight in the position of small farmers and marginalised communities in India. These first three interviews were used for the author's understanding of micro insurances and its broader perspective. The fourth interview was held with mr. Karthikeyan, Programme Leader of the Rainfed Farming Development Program of the

DHAN Foundation. The information from this elaborated interview was directly used in this thesis and gives insight in the genesis of the community-based insurance for groundnut cultivation in Vellore district.

6.3 Data analysis

Three sub questions are used to answer the central research question. See table 6.2 for an overview of the data analysis and the sections in which these questions are answered in this thesis.

Table 6.2: Overview of research questions and data analysis

Research question	Data (analysis)	Sections
1. **What kind of crop insurance systems do farmers in India use and why is there a difference in uptake?**	Literature review Survey (quantitative): socio-demographic profile farmers Focus group discussions (qualitative)	4.1: Crop insurance around the world 4.2 & 5: Crop insurance in India 9.1&9.2: Case study 1, differences in uptake explained 13.1& 13.2: Case study 2, community insurance explained
2. **Does current crop insurance meet the needs and wishes of small farmers?**	Survey (quantitative & qualitative) Focus group discussions (quantitative, tokens)	10.1 Risks experienced 10.2&10.3: insurance needs 14.3 Satisfaction game
3. **What are the merits and demerits of current crop insurance?**	Literature review Survey (quantitative, rating) SWOT analysis (quantitative & qualitative)	5: WBCIS & NAIS opportunities, challenges, scope for improvement 11.1: Rating of insurance aspects 11.2: SWOT analysis

7. Research areas

Primary data collection has been conducted in both Maharashtra and Tamil Nadu states in India. Field location 1 (Maharashtra) has been chosen for the vulnerability level and diversity in crops grown as well as the fluctuations in climatic conditions and affects on agricultural production. Field location 2 (Tamil Nadu) has been chosen for the existence of an extensive community based insurance scheme. See figure 7.1 for the geographical location of the states and the major risks they are prone to.

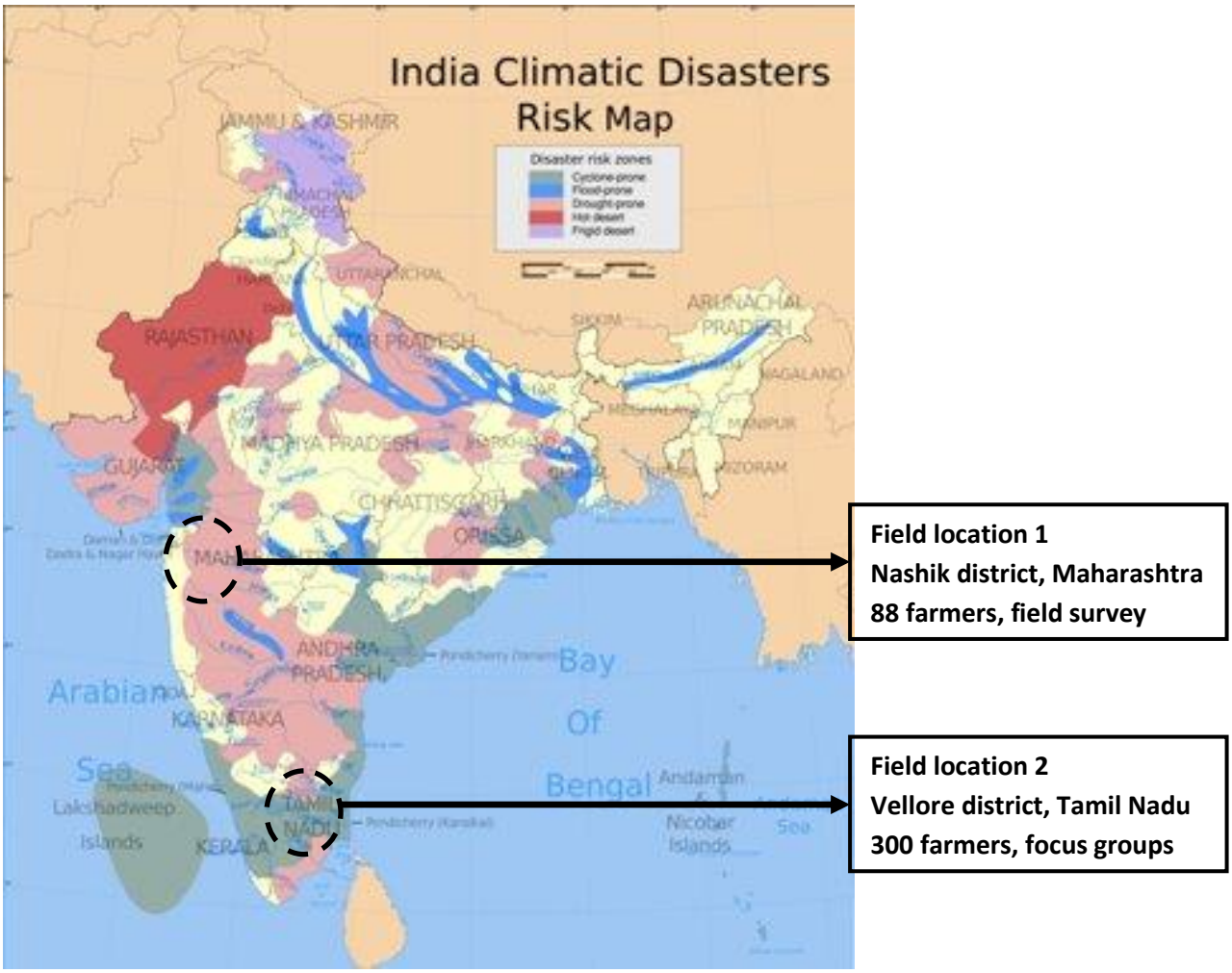

Figure 7.1: Disaster prone area map India (retrieved from New World Encyclopedia, 2007)

Case study 1:

Nashik district, Maharashtra

A farmer in his field (retrieved from The Hindu, 2012)

8. Regional profile Maharashtra & Nashik District

8.1 Maharashtra

Maharashtra is the second most populous state in India (with approximately 98 million people) and is the third largest state (307,713 square kilometres) (The World Bank, 2008; TERI, s.a.). The state, with Mumbai as its capital, remains a financial hub of the country, with a large urban population and contributing to 20 per cent of India's manufacturing output and 13 per cent of its gross domestic product (The World Bank, 2008). Although Maharashtra is a relatively industrialised state, the majority of its population (64 per cent) is working in the agricultural sector, and 47 per cent of its population is living below the poverty line (Met Office, 2012; The World Bank, 2008). The dependency on land in combination with its long coast line of 840 kilometres, makes the state susceptible for changing weather patterns (Met Office, 2012). The state is particularly drought prone: almost a quarter of drought prone districts in India can be found in Maharashtra and 73 per cent of the state's geographic area is classified as semi-arid (The World Bank, 2008). There are several factors influencing the state's vulnerability: in some areas there is intensive mono-cropping; excessive withdrawal of groundwater; high dependence on monsoon season for rainfall (70-80 per cent of the rain falls in months June-September); unfavourable market conditions; and a degrading resource base. Irrigation in Maharashtra covers only 16 per cent of the total agricultural area with very limited access for small farmers (The World Bank, 2002; Met Office, 2012). Rural poverty is prevalent and reflects the low productivity of the rural economy in the state (The World Bank, 2008).

8.2 Nashik district

Nashik district, with capital city Nashik is divided into 15 blocks. Eight of these blocks are classified as tribal blocks, hence the district is identified as tribal by Maharashtra's state government. Several main rivers of the state originate in the district (e.g. the rivers Godavari and Girna). Because the district supplies a vast amount of vegetable to the state capital of Mumbai, Nashik is sometimes refered to as 'the backyard of Mumbai'. (National Informatics Centre, 2014).

Average rainfall in the district is between 2600 and 3000, the precipitation can varies widely between the different blocks and seasons. The main season in which most of the rainfall occurs is from June to September. The government notes that the temperature in the district is increasing and the rainfall decreasing due to rapidly emerging industrialisation and fast deforestation. (National Informatics Centre, 2014).

Main cash crops grown in the area are over the last decades have been onion and grape, although recently sugar cane has gained importance in the district. Main problem in crop growing has been lack of sufficient irrigation and precipitation. In some block farmers have therefore shifted to pomegranate. Other, more progressive farmers, are using greenhouses to grow flowers. (National Informatics Centre, 2014).

9. Crop insurance in Maharashtra

In Nashik district, both WBCIS and NAIS are available. Both insurance types available in the region will be explained in more detail in this chapter. As the farmers in this study cultivate onion as their main crop, the focus of insurance will also be specifically on onion, although there are a number of different crops covered by both WBCIS and NAIS that will also be mentioned. Section 9.1 explains the insurance types in further detail (e.g. premium amount, risks covered, government support, et cetera). Section 9.2 then explains the differences between insured and non-insured farmers in the region.

9.1 Crop insurance aspects explained

Crop insurances under both NAIS and WBCIS are offered in Maharashtra. There are a lot of similarities in the policies of the crop insurances. The main differences are in the fact that WBCIS covers parametric weather related risks, through automated triggers by using weather stations. Whereas NAIS covers most non-preventable risks, such as floods and droughts, using crop cutting experiments. Both insurance policies are open to loanee and non-loanee farmers, but practice shows that majority of farmers are under these insurances are farmers that acquire an agricultural loan and are therewith obliged to have crop insurance. The premium amount and maximum sum insured are very case specific, especially because it is dependent on farmers average yield. Premium subsidies are available for small and marginal farmers and often split between the state and national government.

Table 9.1: Insurance aspects of different crop insurances available in the research area

Insurance aspects	WBCIS	NAIS[8]
Prerequisites		
Linked to credit:	Compulsory for all loanee applicant cultivators (those who have sanctioned credit from financial institutions for the notified crop (onion) in the reference unit area)	From 2009 Onwards, Insurance is not compulsory for Onion, and is made optional for both Loanee and Non-Loanee farmers
Coverage		
Crops covered	Onion, Tomato, Chillies, Gherkins. Tapioca, Turmeric, Banana, Jasmine, Rose, Tuberose and Grapes[9]	Kharif: Paddy, Jowar, Tur, Mung, Udid, Nigerseed, Groundnut, Sesamum, Soyabean, Sunflower, Onion, Ragi, Maize, Cotton, Sugarcane Rabi: Wheat(Irrigated),Sunflower, Summer Groundnut, Summer Paddy, Onion, Wheat(Unirrigated), Jowar, Gram, Safflower
Risks covered:	Parametric weather related risks like rainfall, frost, heat (temperature), humidity, et cetera.	Non-preventable risks (e.g.flood, drought, natural fire, storms, pests/diseases).
Claims		
Claim making	Automated process using reference	Based on yield data gathered with

[8] Government of Maharashtra, 2011
[9] TNAU, 2013

process:	weather stations	Crop Cutting Experiments conducted by state government
Payment process:	Loanee-cultvators: through financial institutions Non-loanee cultivators: through AIC representative/ micro insurance intermediaries/micro insurance agents	Loanee-cultvators: through financial institutions Non-loanee cultivators: through AIC representative/ micro insurance intermediaries/micro insurance agents
Claim amount:	Maximum payout is limited to the sum insured. Payout based on weather station trigger.	In last three years farmers did receive claims in the area; however the claim amount lied between 10 % to 27 % of total sum insured.
Loss assessment		
Crop loss assessment process:	Automated, weather station trigger	Crop cutting experiments in area
Premium		
Premium amount:	2.0% or Actuarial Rate, whichever is less[10]	Kharif onion has 17.5 % per hectare as premium and rabbi onion has 10.94 % premium rate
Maximum sum insured:	Up to 150% of the value of the average yield	Total maximum sum insured will be 150% of average yield
Subsidies:	Up to 50% on premium (for small and marginal farmers)	Small and marginal farmers: 10% (5% state government; 5% national government)

9.2 Differences between insured and non-insured farmers

To understand the different needs of farmers, it is important to first look at the differences in socio-demographic profile. Accordingly, the specific requirements of the various categories of farmers can be established.

Table 9.2: Differences in socio-economic profile between insured and non-insured farmers

Socio-demographic characteristic	Insured farmers	Non-insured farmers
Social category		
SC	3,7%	6,6%
ST	0	8,2%
OBC	18,5%	42,6%
General	77,8%	42,6%
Level of Education		
Lower than Class 5	14,8%	16,4%
Class 5 to Class X	55,6%	52,4%
Class XI to XII	18,5%	16,4%
Graduate	11,1%	11,5%
Postgraduate & Higher	0	3,3%
Number of assets		

[10] AICI, 2012

Phone	100 %	100%
Tractor	81,5%	37,7%
Dish TV	100%	86,9%
Gas stove	92,6%	77,0%
Motorcycle	96,3%	77,0%
Colour TV	100%	100%
Fridge	14,8%	27,9%
Inverter	0%	9,8%
Farmers' category		
Marginal Farmer (upto 2.5 acres)	55,6%	34,4%
Small Farmer (2.5-5 acres)	25,9%	31,1%
Medium farmer (5-12.5 acres)	18,5%	27,9%
Large Farmer (above 12.5 acres)	0%	6,6%
Irrigated land		
Absolute amount (owned land, average)	3,0 acres	3,6 acres
As % of total landholding	93,7%	74,9%
Insurance types		
Life Insurance	63,0%	23,0%
Motor Insurance	96,3%	70,5%
Health / Medical / Hospital Insurance	11,1%	4,9%
Crop loan		
Availing crop loan	92,6%	0%

Table 9.2 shows that it is not necessarily the most formally educated farmers that have crop insurance, nor the largest farmers: more than 50 per cent of insured farmers falls in the marginal farmer category. However, one of the most vulnerable groups, Scheduled Tribes (ST) is not among insured farmers. This could be due to the fact that these farmers have the most marginalised position in Indian society (and have less access to formal risk management instruments), but also due to the fact that these farmers are difficult to reach or the stigma that ST brings along (not all farmers might want to tell they are ST). Furthermore, insured farmers do not necessarily have more assets than non-insured farmers. However, the biggest difference in asset is tractor (85,1% per cent of insured farmers versus 37,7% of non-insured farmers). This could be linked to the fact that insured farmers acquire agricultural loans (which could then be used to purchase a tractor), as well as insured farmers applying more agricultural advanced techniques. Insured farmers also have the largest percentage of its owned land irrigated (93,7% on average as compared to 74,9% of non-insured farmers). This can be explained by the fact that these farmers have more knowledge of agricultural techniques than non-insured farmers and thus also apply these on their own farmland. The most important differences between these farmers are found in the insurances and crop loan they acquire. Motor insurance is the most prevalent insurance among both groups. It also becomes very clear from this table that non-insured farmers have had less exposure to insurance, either they acquired insurance and did not extend it (for example because payments were not regular, or they expected their premium back at the end of the season, like a savings bank account), or they never had insurance before. This has important implications for insurance companies. Specific attention

needs to be paid to awareness raising of these farmers, customised for farmers who have never experienced the process of insurance before. If farmers already have experience with any type of insurance, paying premium and receiving pay-outs, it will be easier for them to understand other types of insurance too.

10. Needs and wishes farmers in Maharashtra

To understand the needs and wishes of small farmers, it is important to first study their perspective on risks and the severity of these risks and then look more closely at their loss assessment methods and more specific needs towards insurances (such as premium and sum insured).

10.1 Risks faced by farmers

Table 10.1 shows the risks in agriculture, with in the first column the amount the risk is experienced by the farmers, the following column the severity of the risk, and the last column the importance farmers give to this particular risk. The first columns (amount experienced and severity) show the most answered option, with the percentage this answer was given. The highest amounts in each column are highlighted using the following colours:

Amount risk: Almost every year
Severity risk: High crop loss and complete crop loss
Rate: Three highest rated risks

Table 10.1: Risk in agriculture: amount experienced, severity and importance for risk mitigation

Risks in Agriculture	Amount risk is experienced	Severity risk	Rate (1-100) Importance for risk mitigation
Poor quality of inputs	Almost every year (66,2%)	Small, but significant (61,5%)	30
Lack of labour supply	Almost every year (47,7%)	Small, but significant (60,0%)	25
Unseasonal rains	Every 1-3 yrs (36,9%) to every 3-5 yrs (41,5%)	Medium loss (50,8%) to small but significant loss (43,1%)	15
Loss from Stray / Wild Animals	Almost never (70,8%)	Negligible loss (90,8%)	7,5
Excess Rains	Every 3-5 yrs (36,9%)	Medium crop loss (41,5%) to high crop loss (32,3%)	40
Drought / Deficient Rainfall	Every 1-3 yrs (32,3%) to every 3-5 yrs (27,7%)	High crop loss (41,5%) to complete crop loss (33,8%)	45
Hailstones	Never (40%) to every 10 yrs (35,4%)	High crop loss (36,9%) to complete crop loss (36,9%)	40
High Winds / Storms	Every 1-3 yrs (38,5%)	Small but significant loss (33,8%) to medium crop loss (27,7%)	15
Adverse Price Movements	Almost every year (30,8%) to every1-3 yrs (27,7%)	Negligible loss (36,9%)	15
Loss from wastage / quality deterioration	Every 1-3 yrs (73,8%)	Small but significant (56,9%)	10
Credit interlocking	Almost every year (49,2%)	Small but significant (43,1%)	12,5
Pests and diseases	Almost every year (50,8%)	Small but significant (61,5%)	35

Dew/ fog	Almost every year (73,8%)	Small but significant (46,2%)	25

As was expected, excess rainfall and drought are perceived as major risks for farmers. These are also the risks with the highest severity of crop loss. However, there was one other risk that stands out: hailstones. Although this risk the has the second highest rating, farmers also acknowledged the risk to occur very sporadically (every 10 years to almost never). Looking at the severity of hailstones could explain these somewhat conflicting answers. Although hailstones do not appear very often, when hailstones are experienced, they damage the crop severely (it is the one of the two risks where a large number of farmers experience complete crop loss). Thus, although hailstones might not occur very often, the damage they bring can be disastrous for farmers.

Furthermore, what is interesting to see is that the risks that are experienced every year, are not the ones that bring the most damage to the crops. This might imply that farmers learn how to cope with this relatively small but consistent risks, rather than dealing with the more severe risks which do not occur every year and could be very irregular. Thus, the need for farmers to increase their resilience should mainly focus on these risks which could potentially lead to major crop losses. What the diversity in experience of the hailstones risk also showed, is the need for farmers to opt to include certain risks in their insurance policy. As farmers do not experience all risks completely similarly, they might want to choose whether or not to include certain risks in their coverage.

10.2 Loss assessment methods applied

To understand what farmers' needs and wishes are for insurance loss assessment, it is important to see how farmers themselves assess when there is crop loss. Therefore, farmers were asked to state their loss assessment method according to the different perils. In the previous section, the three most important risks were stated to be: excess rain, droughts/ deficit rain, and hailstones. For these three perils we now look at loss assessment methods.

Table 10.2: Loss assessment methods category 1 and 2 farmers

Risk	Loss assessment
Excess rain	Physical (overall) assessment (95,4%)
Drought	Observing crop growth (56,9%)
	Observing weather change, weather pattern (12,3%)
Hailstones	Crop and field assessment (86,2%)
	Not seen (12,3%)

For all three risks, the majority of farmers apply some sort of physical assessment of their crops to establish the damage done by any of the weather perils. Only some of the farmers look at the weather change or pattern for drought, and this was not even mentioned for excess rainfall or hailstones. This could have an implication for weather index based insurances, as farmers not necessarily use weather as an indication for crop losses, but apply physical assessment of their own crops. These data show that individual field assessment of crops is preferred for the most important risks of these farmers. And although the majority of farmers uses physical assessment to calculate their losses, majority of farmers stated they had never heard of crop-cutting experiments before to calculate losses. Clearly, there is a mismatch of what the farmers themselves apply and prefer as

opposed to the terminology insurance companies use for calculating pay-outs. On the other hand, as only a couple of farmers look at the weather to establish their losses, almost none of the farmers had ever heard of insurance based on weather data.

Farmers were also asked how many claim payments would be ideal during 10 seasons of crop insurance. Not surprisingly when you look at the occurrences of the main risks (every 3-5 years for drought and excess rain, and every 10 years for hailstones), the majority of farmers considered one to three payments ideal. Which, for an insurance to be sustainable is also preferred over a pay out of every single year.

Insured farmers were asked more in depth questions. To assess whether rainfall is sufficient for planting, farmers apply different methods, most of which involve physical assessment of rain. This is done by checking the soil (observing depth of wetness, there should be at least 7 to 8 inches of moisture), and the number of rainfall in the sowing period (at least 1 to 2), but also by checking the level of water in wells and rivers. For crop insurance this means that rainfall and wetness of soil play an important role in the initial phase of crop cultivation, and should be taken into account in policy design. Insured farmers also assess their losses mainly by physical assessment, although some farmers also mentioned to base loss assessment on their agricultural experience. Experience also plays an important role when farmers are setting their target yield for the season. However, the availability of water and labour are also important indicators to establish the target yield. Of a bit less importance is crop monitoring. This is an interesting finding, as this means that in setting a target yield the physical assessment is less important than the weather circumstances and experience, while in loss assessment this is reversed.

When talking to insured farmers about the differences in yield between their neighbours and them, agricultural inputs (such as fertilizer and the quality and type of seeds) are mentioned as reason for creating differences, and similar agricultural inputs as reason for comparable outputs. In comparison to other farmers in the village (not direct neighbours), water availability and irrigation systems are considered important reasons for diversity in yield. This again makes clear that crop insurance cannot be a stand-alone measure, but needs to be part of a broader risk management package. In this area, water availability is an important constraint to agricultural production, which means that the installation of water buffering systems (e.g. drip irrigation) in combination with crop insurance could increase the resilience of these farmers and increase the feasibility of crop insurance. This also becomes clear when asking farmers about the ways losses can be mitigated: mainly agricultural inputs are mentioned for risks specifically related to the farmers themselves. But when asked about ways to deal with uncontrollable risks a couple of farmers mentioned crop insurance, but most farmers did not see an option for this.

By far, the majority of farmers perceive a community based model for insurance desirable. And to achieve a village level insurance programme, there is a need (mentioned by the farmers themselves) to involve farmers in the insurance design and implementation of such an insurance. Also, the pooling of risks is considered to be essential, which should function as the basis of a community based insurance programme.

10.3 Premium and the role of insurance companies

To understand the awareness level of farmers that have basic understanding of insurance and agricultural techniques (30 farmers), they were asked some general insurance questions. When these farmers were asked to mention three insurance companies, only two farmers could mention three different companies, two more could mention only two, three farmers could mention one company and the rest (23 farmers) did not know any insurance company. Clearly, for farmers not in direct contact with insurance companies (and even for farmers that are), the visibility and presence of these companies in the village is lacking.

Insured farmers want the premium of crop insurance to be based on both historical loss experienced from insured perils and want an affordable premium at the same time. Confusion about terms and conditions and the fact that farmers often feel that insurance policies are rather complicated, is why farmers are asking for transparent and regular information provision and want to have clear terms and conditions set for the insurance. As farmers often experience insurance as a gamble (they never know whether it will pay out), it would also be helpful to build in a guarantee mechanism. For frequent widespread losses on account of insured perils, farmers emphasised the need for a refund mechanism (e.g. returning at least half of the premium or have a bonus system in place if there is no pay out for at least five years). This is particularly important for small farmers, for whom premium can be a relatively large amount of their disposable income.

According to the farmers, insurance companies should play different roles. They want a fair settlement process in which the insurance company clearly explains how losses are assessed and on what basis the level of claim payments are set. There should thus be a transparent loss assessment mechanism which is also explained to farmers. This could also involve training of farmers in understanding the sometimes complex structure of the crop insurance. Furthermore, as farmers have more trust in a village level committee (consistent of people they know and are accessible whenever they have any questions or enquiries) than in an insurance company they do not know very well, farmers are suggesting insurance companies to establish village level committees that can be used to verify the insurance process. Apart from information provision, transparency and an understandable insurance policy, another issue with insurance companies has been the delays in claim payments. For small farmers, this has serious consequences, as they need the payments to buy inputs for the next season. Thus, insurance companies need to make sure claim payments are timely and reach the farmers in time to actually reduce their vulnerability.

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11. Evaluation of crop insurance aspects

To understand what aspects of crop insurances are preferred, and what aspects need to be improved, farmers were asked about their preferences. The more in depth questions were asked to insured farmers. Section 11.1 shows the ratings farmers gave to different insurance aspects, and section 11.2 combines both the literature review and the survey into a SWOT analysis.

11.1 Rating insurance aspects

As insured farmers have some basic insights in crop insurance, they were asked to their preferences of three main aspects of the insurance: risks covered, peril coverage, and loss assessment method (see table 11.1). The different aspects were ranked in the subcategory as well as compared between categories to understand what aspects these farmers find most important.

Table 11.1: Preferences insurance aspects

		Group Ranking	Yes (%)	No (%)
Risks covered	Weather	1	73,3	26,7
	Pests / Diseases	2	50	50
	Price / Market	3	20	80
	Loss from Animals / Theft	4	3,3	96,7
Peril coverage	All Perils	1	46,7	53,3
	High-Intensity Loss Events	2	36,7	63,3
	Named Perils	3	23,3	76,7
Loss assessment method	Group-based	1	43,3	56,7
	Village-based	2	40	60
	Individual Assessment	3	20	80

Preference for risks covered goes out to weather and to a lesser extent pest and diseases. This also is in line with the risks experienced and their severity from chapter 10. As loss from animals or theft did not play an important role in crop loss, there is almost no preference for this option. For the peril coverage, all perils and high-intensity loss events are both preferred options, but not with the majority of farmers (46,7% and 36,7% per cent respectively). Both group and village based loss assessment are preferred options over individual assessment, which is a somewhat surprising outcome, but could be due to the fact that farmers are more familiar with group and village based decision making, and might not fully understand the insurances product (as became clear in chapter 10 with regards to crop-cutting experiments).

Table 11.2: Rating crop Insurance aspects (according to insured farmers)

Crop Insurance Features	Rating (Out of 100)	Standard deviation
1. Active / Higher Involvement in Design of Crop Insurance	71,7	14,0
2. Revenue / Income Insurance (Crop Insurance that takes into account both production and price risks)	70,0	18,7
3. Voluntary Coverage under Crop Insurance	69,6	24,0
4. Insurance for losses that arise from unseasonal rains, hailstorms etc. after harvest	66,7	20,5
5. Community / Group-based Loss Assessment and Claim Redistribution (Community to be responsible for assessment of crop losses from insured perils and also for redistribution of claim amount received from insurance)	58,7	17,1
6. Premium-Refund based Multi-year Policy (Single Crop Insurance Policy providing coverage for Multiple Years and Returning Premiums in case of No Claims)	57,8	22,3

Table 11.2 shows that insured farmers rank involvement in the design of crop insurance the highest, with the lowest standard deviation. This is in line with the qualitative data used in the previous chapter. They also rate income or revenue insurance as second. This means that farmers want the insurance to cover not only production risks (such as excess or deficit rainfall) but also changes in price. As most farmers are insured mandatory because they avail a crop loan, voluntary coverage is also seen as an asset for these farmers, to opt in or out of insurance if and when a farmer deems this necessary. Clearly, many of the aspects are considered important by the farmers, and there are differences in preferences. This marks the importance of a tailor-made approach. Farmers need to be able to choose the aspects of insurance (such as peril coverage) if they find it important for their specific circumstances.

11.2 SWOT Analysis

Summing up the findings in the previous chapter, a SWOT analysis was used (see table 11.3) for individual micro insurances under NAIS and WBCIS combined. Both the literature review and the outcomes of farmers' ratings and qualitative data chapters, were used to find the harmful and helpful aspects of current crop insurance in India. The following definitions are used:

Internal

- **Strengths**: these consist of helpful aspects in product design of the insurance.
- **Weaknesses**: these are characteristics that place the insurance design (technical and financial aspects) in disadvantage, and can thus be considered harmful.

External

- **Opportunities**: these are chances in the environment that can increase the effectiveness of the insurance.
- **Threats**: these are elements in the environment that could hinder the effectiveness of the insurance.

Table 11.3: SWOT analysis micro crop insurance

	Helpful	Harmful
Internal product design: technical & financial	**STRENGHTS** *Weather peril coverage* *1-3 payments per 10 seasons* *Coverage of production & price risks*	**WEAKNESSES** *Basis risk* *Complicated terms and conditions* *Delays in claim payments*
External Implementation & environment	**OPPORTUNITIES** *Involving farmers in implementation* *Village based information structure* *Part of integrated risk management strategy*	**THREATS** *Lack of awareness and understanding* *Lack of infrastructure (e.g. weather stations)*

As the opportunities for crop insurance in India mostly point towards community insurance and involvement of farmers in implementation and design of crop insurance, the next chapter studies the most comprehensive case in India where these recommendations were turned into reality: community crop insurance in Tamil Nadu in India.

Case study 2:

Vellore district Tamil Nadu

Focus Group Discussion with farmers in Vellore district, Tamil Nadu (photo from fieldwork)

12 Regional profile Tamil Nadu & Vellore district

12.1 Tamil Nadu

12.1.1 Geographic profile

Tamil Nadu is located at the South eastern part of India, with a long coastline stretching over 1000 kilometres over the eastern and southern part of the state. Due to its long coastline temperatures do not reach extremes in summer and winter season. The state experiences both southwest monsoon and northeast monsoon, table 12.1 displays the percentage of rainfall for the different seasons (Revenue Administration, Disaster Management & Mitigation Department, 2006).

Table 12.1: Tamil Nadu rainfall in the different seasons

Season	Months	Normal rainfall in mm	Percentage of annual rainfall
Winter rains	January- February	47.00	4.82%
Summer rains	March – May	138.00	14.12%
Southwest monsoon	June – September	322.00	32.96%
Northeast monsoon	October - December	470.00	48.10%
Average rainfall		**977.00**	**100.00%**

(Retrieved from Revenue Administration, Disaster Management & Mitigation Department, 2006)

The state covers a total land area of 130,058 square kilometres and is home to 72,138,958 inhabitants resulting in a population density of 555 per square kilometre (Government of India, 2011a). The literacy rate in the state is 80.33 per cent for the entire population, with a difference for males (86.81 per cent) and females (73.86 per cent) (Government of India, 2011a). Tamil Nadu counts 32 districts, of which Vellore is one.

12.1.2 Groundnut farming Tamil Nadu

Karunakaran et al. (2009) found that farmers in Tamil Nadu selected groundnut cropping for several reasons, which included realisation of higher income, being best suited to their land, and meeting fodder requirements for their livestock (as groundnut hay is used to feed livestock). Decisions on the practices of groundnut farming depends on ownership of the farm resources (e.g. assets such as land, credit, livestock and machineries), which implies that in most cases the male holds decision power (Karunakaran et al. 2009). In Tamil Nadu, both NAIS and WBCIS government schemes are available for groundnut farmers to insure their crop. Table 12.2 and 12.3 show the performance of both schemes in Tamil Nadu. The performance of the two insurance types show that very little farmers actually benefitted from the government insurance schemes available in the state.

Table 12.2: Performance of NAIS of groundnut in Tamil Nadu

Year (BE)	Area Covered (%)	Claims Ratio	Premium / sum assured (%)	Claims / sum assured (%)	Farmers Benefited/ Farmers Covered (%)
2001-2002	0.37	1.34	3.50	4.70	18.87
2003-2004	0.15	1.21	3.50	4.23	31.52
2005-2006	0.12	0.69	3.50	2.40	14.75
2007-2008	0.27	0.07	3.50	0.26	2.74
2009-2010	1.05	1.37	3.57	4.98	35.63

(retrieved from National Centre for Agricultural Economics and Policy Research, 2011, p.7)

Table 12.3: WBCIS in Tamil Nadu in 2008-09 to 2009-10

Company name	Number of farmers	Area in hectares	Sum insured Rs. Lakhs	Full premium Rs. Lakhs	Claims Rs. Lakhs	Farmers benefited
AICI	36935	41119.75	7988.6	758.6	237.8	13645 (36.97%)
ICICI Lombard	129	92	23	2.505	0	0 (0 %)
IFFCO Tokio	27	28.8	6.29	0.659	0.31	13 (48.15%)
Total	**37091**	**41240.55**	**8017.89**	**761.73**	**238.07**	**13658**

(Retrieved from Kumar et al. s.a.)

12.2 Vellore district

Vellore district consists of an area of 6,077 square kilometres, with a total population of 3,928,106 and a population density of 572 people per square kilometre (which is slightly higher than the average for the state) (Census2011, 2011). Literacy rate in Vellore is 79.65 per cent (86.96 per cent for males, 72.43 per cent for females). The rural population makes up 56.87 per cent of total population (Census2011, 2011).

Vellore experiences a tropical climate with rainfall from both southwest monsoon (contributing to 45 to 52 per cent of rainfall) and northeast monsoon (contributing to 30-43 per cent of rainfall) (Balakrishnan, 2009). The annual normal rainfall for Vellore district is 949.8 mm and mean temperature range from 18.2°C to 36.8°C (Balakrishnan, 2009). Table 12.4 displays the rainfall in Vellore district compared to the 'normal' rainfall for Tamil Nadu. With reference to the `Normal' , the following classification is made (from Directorate of Economics and Statistics, s.a.)

`Excess' : (+) 20.0 per cent and above:
`Normal' : (-) 19.9 per cent to (+) 19.9 per cent.
`Deficit' : (-) 20.0 per cent to (+) 59.9 per cent.
`Scanty' : (-) 60.0 per cent and less.

As becomes clear from the table, although annual rainfall can be considered normal for all years except 2007, there is a lot of variation within the different seasons. Vellore district experiences both deficit and excess rainfall in the various seasons of the year.

Table 12.4: Vellore district rainfall compared to Tamil Nadu 'normal' rainfall

	TN Normal (in mm)	2006	2007	2008	2009	2010
South-West Monsoon	**316.1**	**427.7**	**582.4**	**312.1**	**434.4**	**456.8**
June	41.9	121.2	85.5	44.5	44.5	116.8
July	71.2	34.4	188.9	70.4	17.5	123.3
August	90.2	75.5	183.8	87	120.7	99.7
September	112.8	196.6	124.2	110.2	251.7	117
North-East Monsoon	**431.1**	**308.7**	**441.1**	**376.3**	**238.8**	**410.7**
October	180.9	162	159.1	121.5	17.4	88.9
November	165.1	109.6	65.3	247.7	154.1	234
December	85.1	37.1	216.7	7.1	67.3	87.8
Winter Season	**35.3**	**3.2**	**1**	**14.3**	**2.4**	**9.5**
January	21.0	3.2	0	11.4	2.4	9.5
February	14.3	0	1	2.9	0	0
Hot- Winter Season	**129.1**	**116.2**	**124.3**	**160.8**	**83.1**	**132.1**
March	19.5	34.8	0	66.9	1.2	0
April	42.6	26.1	59.9	10.6	10.8	19.7
May	67.0	55.3	64.4	83.3	71.1	112.4
Total annual	**911.6**	855.8	1148.8	863.5	758.7	1009.1

Agriculture plays an important role in Vellore District: 40 per cent of the population directly depends on agriculture (both cultivators and agricultural labourers), and one third of the geographical area is used for cultivation (Centre for Agricultural and Rural Development Studies, 2008). In the district there are 411,091 agricultural landholdings which cover a total size of 275,578 hectare. The average size of a landholding is 0.67 hectare, which classifies as smallholding (Government of Tamil Nadu, s.a.) The main crops under cultivation in Vellore district are shown in table 12.5.

Table 12.5: Main crops cultivated in Vellore district

Crop	**Area under cultivation** (in hectare, 2005-06)	**% of Total Cultivation** (net area sown=2099.03 km2 or 209903 hectares in 2005-06)
1. Groundnut	59,842	28.5
2. Paddy	58,163	27.7
3. Millet & other cereals	24,041	11.5
4. Pulses	20,088	9.6
5. Sugarcane	17,202	8.2

6. Cotton	7,013	3.3
7. Gingelly	794	0.4

(Retrieved from Balakrishnan, 2009)

Although irrigation is predominant in the district, the majority of groundnut cultivation is rainfed (49,540 hectare rainfed against 15,535 hectare irrigated in the 2006-2007 season) (Centre for Agricultural and Rural Development Studies, 2008). The fact that Vellore is a drought prone district has resulted in overexploitation of ground water in a large number of blocks through open wells and deep bore wells (Centre for Agricultural and Rural Development Studies, 2008). Both Nattrampalli and Gudiyatham blocks experience overexploitation of groundwater (Balakrishnan, 2009). In Vellore district, the crop insurance government scheme that is available is NAIS, WBCIS is not available in Vellore district. Table 12.6 shows the coverage of farmers in Vellore district under NAIS: the majority of farmers are loanee farmers (and avail insurance as mandatory condition of their agricultural loan).

Table 12.6: NAIS coverage of loanee and non-loanee farmers in Vellore District

Programme	**Number of farmers**	**Area** (in hectare)	**Sum insured** (in lakh Rp	**Premium** (in lakh Rp
NAIS 08-09:[11] loanee farmers	6345	7070	1295.6	29.6
NAIS 08-09: [12] Non-loanee farmers	1411	307	61.1	1.4

13. Community based insurance: DHAN's mutual insurance

The community based crop insurance scheme has been implemented by DHAN (Development of Humane Action) Foundation since 2007. DHAN Foundation works on various rural development projects. Prior to implementing pilot mutual insurance policy, DHAN Foundation had experimented with index based insurance for three years.

13.1 Piloting Index Insurance

2003 and 2004 were particularly harsh years for Vellore in terms of droughts and deficit rainfall. In response, DHAN Foundation searched for a risk management strategy that could be implemented for farmers to reduce the negative impact of these weather-related risks. In cooperation with ICICI Lombard, index-based rainfall insurance was launched in the 2004-2005 season in Natrampalli and Tirumangalam (Tamil Nadu) covering Groundnut, Cotton and Blackgram farmers. Prior to implementation there were several consultation rounds with the farmers through the DHAN structure (with committee members, after which decisions were communicated back to the farmers for feedback). The index insurance was a pilot project for three years. Every year improvements were made on the basis of feedback of farmers. After three years, consultation with farmers on the index insurance resulted in discontinuing this type of insurance. DHAN Foundation's experience with index based insurance highlighted several inherent problems of weather based index insurance:

[11] Mani et al. 2012
[12] Mani et al. 2012

- 'Basis Risk', due to variation between villages and the reference weather station in experiencing rainfall
- Insurance companies were not able to offer customized policies on a micro-scale
- The weather insurance product for groundnut based on rainfall did not reflect reality in terms of yield risk. For example: the rainfall insurance product pertaining to early part of the sowing season always need higher premium; but yield has always been better if sown in the early part of the sowing season

In addition to these problems, there were also problems of farmers trying to externalize the issue of yield loss and look forward towards some compensation irrespective of the crop loss situation. This was mainly due to inadequate understanding of the concept of insurance (Karthikeyan,2013).

Table 13.1 below depicts DHAN Foundation's experience in piloting deficit rainfall insurance in Natrampalli for three years. From the table it can be viewed that in 2005-06, farmers experienced a loss to crop yield due to excess rainfall however they did not receive any compensation because they were insured against deficit rainfall.

Table 13.1: Deficit rainfall index insurance DHAN Foundation 2005-2007, Natrampalli

Details/ Year	**2004-2005**		**2005-2006**		**2006-2007**
Crop	Groundnut	Cotton	Groundnut	Cotton	Groundnut
Type of policy	Single phase		Single phase		Multiple phase
Units	119	29	506	73	182
Area per unit	0.5 acre	0.25 acre	0.5 acre	0.25 acre	0.5 acre
Farmers	109	21	432	41	182
Premium (Rs)	17,993	8,175	101200		46,264
Sum Insured (Rs)	3,57,000	1,45,000	15,18,000		2,73,000
Rainfall received	Slightly Deficit	Slightly Deficit	Excess rainfall		Optimum rainfall
Crop performance	Average	Loss due to deficit rainfall	**Loss due to excess rainfall**		Above average
Compensation	29183	24490	-	-	-
Per unit compensation	245.2	844.5	-	-	-
Insurance company	ICICI Lombard				

Source: M. Karthikeyan,2013

Based on their experience of Rainfall Index Insurance, DHAN Foundation felt that there was a need for tailor made, location specific means of covering production risks faced by rain-fed farmers.

Learnings from Index Insurance based on DHAN Foundation's experience

- Micro climates exists even at small geographies
- Significant variation in rainfall pattern and quantum among village rain gauges
- Number of rainy days are decreasing
- Copious rains within few rainy days
- Rainfall is not uniformly distributed
- Drought before and after the crop's critical period even though the average rainfall is received during the entire cropping season

Also, they were of the opinion that insurance mechanism should be such that it needs to be owned by the insured farmers to avoid conventional problems of adverse selection and moral hazard and to make it a solution in terms of motivating the farming community to look for all means of avoiding risk. Therefore, DHAN Foundation shifted to Mutual Crop Insurance (MCI) as it offered all these advantages.

13.2 Piloting Mutual Crop Insurance (Community Insurance)

DHAN Foundation piloted **mutual yield based insurance** in 2007. The participating members were already organised into Self-Help Groups (SHGs) of around 15-20 members for various farming related interventions provided by DHAN Foundation in the past. The same structure was used for insurance as well. The technical support to pilot mutual crop insurance was provided by Micro Insurance Association of the Netherlands (MIAN) and back up guarantee support was given by Eureka Re.

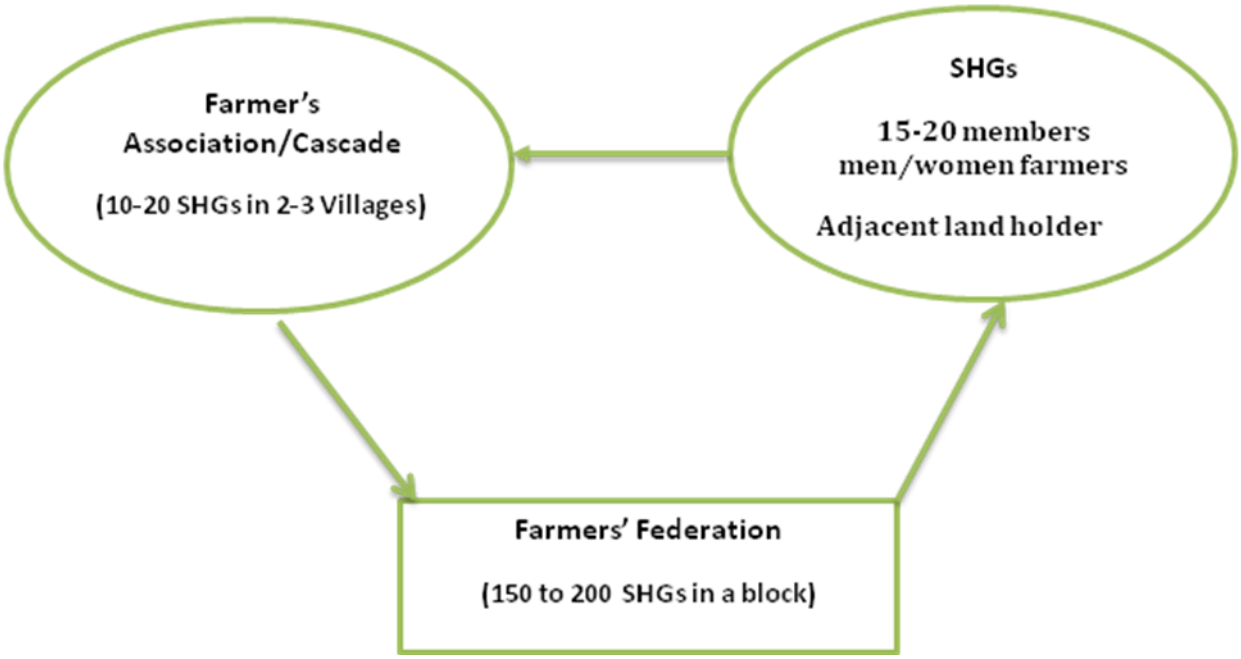


Figure 13.1 DHAN Community Model *Source: DHAN Foundation, interview*

13.2.1 Designing a Mutual Insurance Product

Data on past experience of rain-fed groundnut cultivation in Natrampalli was collected from a group of farmers. This included frequency, levels and causes of loss, variations across the location and cost of cultivation. MIAN used this data to create a mutual insurance product. This product was discussed in detail with MIC and they customized the product in terms of sum insured and premium per acre. It was decided to go for the groundnut mutual insurance policy with Rs 2,000 as sum insured and Rs 500 as premium per acre. Out of Rs 500, the risk premium was Rs 468 and the administrative cost was Rs 32. The design of the product was such that cost of cultivation was considered as the bench mark for compensation and not the expected income to make the product affordable. The MIC also evolved the norms for implementing this mutual insurance product for groundnut and methods of assessing yield. In designing the product and the mechanism of monitoring, concerted efforts were

taken to avoid conventional problems of crop insurance i.e. adverse selection, moral hazard and slow loss assessment process. (Karthikeyan, 2013).

Table 13.2: Details of the mutual insurance scheme

Crop Insured	Sum Insured per acre (Rs)	Premium paid by Farmers per acre (Rs)
Groundnut	2,000	500

13.2.2 Selection of farmers and plots

Identification and selection of members was done under the following criteria:

- Small (5 acres) and marginal (2.5 acres) farmers
- Predominantly rainfed farming hamlet (30 per cent or less irrigated land)
- Solidarity among farmers, which implies farmers being either neighbours or at least within a 2 kilometre radius

The team of MIC member, professional and associate visit each farm to identify the insured plot of land and to take basic details of groundnut crop. If the sowing is taken up in shaded area, such area is deleted from coverage. Also, if low seed rate was practiced, seed rate based area is taken for coverage.

13.2.2 Yield assessment process

Farmers under this policy are indemnified based on actual loss assessment done by older and wiser farmers. To accomplish this, a committee named as Mutual Insurance Committee (MIC) was formed by selecting two to three farmers from each location. These farmers were selected based on their track record of involvement in community activities and knowledge of groundnut cultivation.

Table 13.3: Mutual Insurance Committee (MIC)

▪ A Mutual Insurance Committee (MIC) is formed at the federation level
▪ The number of members in MIC is around 15 to 30
▪ The generic roles of this committee is: (i) Policy making related to insurance product and reviewing the policy at periodical intervals (ii) Implementation of insurance product (iii) Managing the funds related to insurance ▪ The specific roles vary with products

As per the norms of mutual crop insurance policy, all farmers were required to inform the MIC a week prior to intended harvest. The plot harvested without giving information would be removed from coverage. The MIC members visit each farm just before harvest to assess yield. A sample from the farm is taken to assess the yield of the insured plot of land. Sample yield assessment is done by

using a cycle tyre. Sample is collected from four corners of the plot at a distance of 10 feet from each corner and also in the centre. The measurement of yield is done by crown filling method, whereby the conversion ratio is:

12 Litre=1 Vallam

(1 Vallam= 8 Kg of fresh produce)

42 Vallams=1 Putti

While measuring yield, one eighth of volume of the fresh produce is to be deducted for wages and 15 Vallam (i.e. 120 Kg) is to be deducted for half acre seed material. Also the value of plant residue is not taken into account for calculating total income. The current year farm gate price is used for calculating value of the produce. Average price for the season is found by taking into account high and low prices in the season.

13.2.3 .Addressing moral hazard

Moral hazard risk was addressed by introducing retention, which requires farmers to pay a pre-determined percentage of their loss themselves. The extent of retention of losses by the farmers was decided by themselves as 35% i.e. Rs 1,000 out of the total expected loss of Rs 3,000 per acre.

Furthermore, the organization of the claim assessment process was expected to ensure a further reduction of moral hazard risk and an improvement in time and cost efficiency. Because each MIC member was responsible for assessing claim in his/her own area, they were expected to be to be more aware of the production history of the insured person and plot. This would entail good judgment of crop damage quickly. Also, an implication of farmers owning the mutual pool is that they are very critical to what type of farmers is accepted as members in the insurance pool. This environment of social control and familiarity of colleague farmers with production circumstances help abandoning of fraudulent farmers and those who have not taken adequate preventive measures. For example: if a plot is highly prone for losses it would be rejected from coverage in the beginning itself (Karthikeyan).

13.2.4 Exclusion of compensation

Compensation is not given for human negligence, which is identified during periodic visits. Also, if there is yield loss due to heavy weed infestation, the plot is removed from coverage. Similarly, if there is yield loss due to damage by wild animals (wild pigs) the plot is removed from coverage. In addition, if sowing is taken up in shaded area, such area is deleted from total area covered.

14. Performance of Community based Insurance

14.1 Business Statistics

DHAN Foundation insured 379 farmers under its mutual crop insurance policy in 2012-13 in Natrampalli and Gudiyatham blocks of Vellore district.77.3 per cent of the farmers were from Natrampalli and 22.7 per cent were from Gudiyatham block. Under this scheme 201.1 acres of land was insured, out of which 78.9 per cent of the insured land was in Natrampalli and 21.1 per cent in Gudiyatham.

Of the 379 insured farmers in the two blocks, 308 farmers i.e. 81.3 per cent of farmers actually benefitted (i.e. [Actual Pay out-Premium Paid]>0) from the mutual insurance scheme. In the two

blocks, there is a difference in percentage of farmers that benefitted: in Natrampalli 91.5 per cent of total insured farmers in the block benefitted, whereas in Gudiyatam this was only 46.5 per cent.

Table 14.1: Business Statistics Mutueal Insurance 2012-13

	No. Of farmers covered	Area insured (Acres)	Payout Limit (Rs)	Gross premium (Rs)	Claims Paid (Rs)	Claims/Premium Ratio	No. Of farmers benefitted*
Natrampalli	293	158.6	3,17,160	78,900	2,33,855	3.0	268 (91.5%)
Gudiyatham	86	42.5	85,000	21,625	30,915	1.4	40 (46.5%)
Total	**379**	**201.1**	**4,02,160**	**1,00,525**	**2,64,770**	2.6	**308 (81.3 %)**

*(Actual Pay out-Premium Paid)>0

14.2 Profile of Insured Farmers

The average area insured per farmer under this policy was 0.53 acres. Out of the total insured farmers, we interacted with 26.4% of the insured farmers. These farmers were randomly selected from the two blocks by DHAN Foundation officers. Average land holding of the sample was 2.1 acres out of which average land holding under groundnut cultivation was 1.0 acres, which constitutes 47.6% of their total land holding. It was observed from the sample that in Natrampalli around 44.0% of the land holding was for groundnut cultivation while in Gudiyatham, major share of the land holding (78.5%) was kept for groundnut cultivation. The rest of the land was intercropped with Green Gram, Black Gram, Red Gram, Fodder Sorghum, Little Millet and Field Bean.

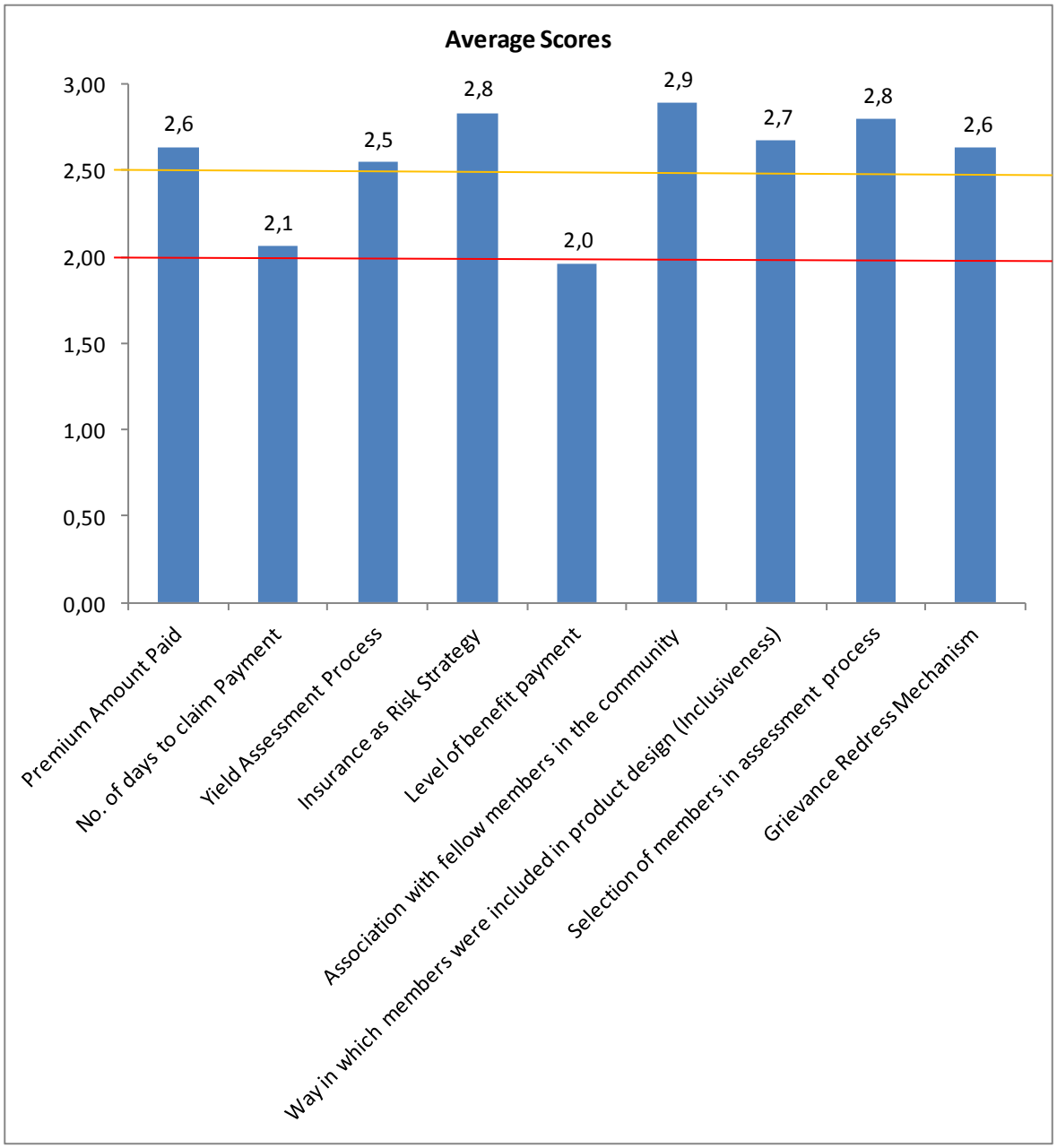
Table 14.2: Profile of Insured Farmers

	Nattrampalli		Gudiyatam		Total	
Population						
Total number of insured farmers under groundnut community insurance	293 farmers		86 farmers		379 farmers	
Average area insured (groundnut) of total population (in acres)	0.54 acres		0.50 acres		0.53 acres	
Sample Focus Group						
Sample size focus group discussions	76 farmers	25.94%	24 farmers	27.91%	100 farmers	26.4%
Average land size of sample population	2.3 acres		1.4 acres		2.1 acres	
Average land size under groundnut cultivation sample population (in acres)	1.0 acres		1.1 acres		1.0 acres	
Share of groundnut land in total landholding area (sample population)	44.0%		78.5%		47.6%	

14.3 Satisfaction community insurance

In the Focus Group Discussions farmers were asked to rank each indicator as satisfied, neutral or dissatisfied. Based on these ratings a weighted average score was calculated. An average score between 1 and 2 is considered dissatisfied, an average score of 2 is considered neutral and an average score between 2 and 3 is considered as satisfied. The satisfaction index for the various indicators are portrayed in figure 14.1 (the calculations can be found in appendix 4). The scores suggest that the farmers are satisfied with all the indicators however the indicator 'No of days to claim payment' and 'Level of benefit received' received a relatively low score in comparison to all the other seven indicators.

Figure 14.1: satisfaction index



14.3.1 Not satisfied: 2,0 and lower

There is one indicator that just falls into the category of not satisfied on the index scale: *Level of benefit payment*. This means farmers are not satisfied with the amount of pay-out they receive when a claim is made. As the pay-out is done on an individual farm basis, some farmers expressed their dissatisfaction with the fact that neighbours received a larger pay-out. Also, remarks were made on the difference between loss and level of payment. However, insurance was not discarded as risk management strategy (see indicator *Insurance as risk strategy*).

14.3.2 Mildly satisfied: 2,1-2,5

Two indicators the farmers were neutral to mildly satisfied are Number of days to claim payment and Yield assessment process. As the assessment process is based on a individual farm level, where the Mutual Insurance Committee takes a random sample, the time to pay-out can take a relatively long time, which makes the farmers less satisfied with the pay-out time. This could also pose a problem, as farmers often need the pay-out to purchase new groundnut seeds. The assessment process is done in the presence of the farmer and it did not become crystal clear why the assessment process was not higher rated by the farmers; also because this type of assessment process was established after consultation with farmers. However, the mild satisfaction on this category could be related to the exclusion of certain plots (e.g. in the shadow) and no pay-out when there are problems with wild animals.

14.3.3 Highly satisfied: 2,6 and higher

On the majority of indicators (6 out of 9) the farmers were highly satisfied (more than 75 percent on the index scale). These include the premium amount paid; insurance as risk strategy; association with fellow members in the community; inclusiveness; selection of members in assessment process; grievance redress mechanism. The fact that this particular insurance scheme was designed in consultation with the farmers themselves and aspects such as premium amount paid were checked with the farmers before included in the insurance, could explain the satisfaction level of the farmers in the community-based scheme. Also, the democratic process in which farmers are chosen to represent their community on a higher level within the structure is likely to contribute to satisfaction of farmers and the feeling that they can redress their grievances and feel that they have (and had) influence on the insurance design.

15. Discussion

The situation of small farmers around the world can be read about in policy documents and academic literature. However, it was only when talking to these farmers that I realised how profound the problems are they are facing. In some villages, women headed households are very common: although the husbands often have the power to make decisions, women are doing the farm work and are taking care of the children, while men migrate in search for employment opportunities. This makes these households even more vulnerable. By listening to the problems these farmers are facing, climate change has become dauntingly real. These farmers face the changing climate every single day. Although I feel mitigation is as important as adaptation, for the daily reality of millions of people around the world, adaptation will be the only short term solution that can make them more able to cope with the weather and climate related issues they are facing.

It is hard to imagine that the people that provide food, and work the lands, are not the first ones we think about when discussing climate change issues. Small farmers around the world have been living on their lands for generations, and are now experiencing the negative consequences of other people's progress and development. It is due time that rural communities are listened to and empowered to the extent that they are able to cope with the hardships they are facing every day.

One of the most important lessons for me has been how urgent the issues at hand actually are. Not only farmers, but rural development (and more importantly empowerment) in general is not on the agenda. Zooming in on the study at hand, it would be interesting to study the gender role more thoroughly, especially in a country as India where the gender roles are very inflexible and women are often deprived of basic rights. Talking about risk management is per definition also talking about rights and access to land and resources. One of the things that worry me in the case of crop insurances is that commercial companies, that have no connection to the community they are selling a product to, are solely there to make a profit. This would not be a big problem if the contract reflects a symmetric power relationship. However, a large number of farmers never had any type of insurance before and therefore do not fully grasp the product they are buying. In a country where the government (on several levels) is not always as effective as would be ideal, lack of regulation (or implementation of regulations) could lead to insurance companies taking money out of communities that would much rather be invested in strengthening communities. In this, working together with local organisations of course helps. And although the structure DHAN Foundation implemented is very promising, it is questionable whether it would be even possible to scale up such a structure. Strong local organisations are essential to further the development of community insurance. DHAN already had a structure in place, and it seems that cooperatives and self-help groups can not only be useful for farmers to function as a safety net, but might in the future also help farmers to become more productive.

It is important to keep in mind while reading this thesis that the case studies are location specific. Climatic, cultural, social and economic differences in other locations can therefore influence the usability of the results in other places and circumstances. However, by using both farmers under automated micro insurances as well as community insurance, a broader overview is given as opposed to one single group of farmers under one type of crop insurance.

16. Conclusion & recommendations

India is a country with 80 per cent of its farming population being categorised as small and marginal farmers. These are farmers with very little buffer, and are extremely vulnerable to any shocks and stresses. As they have a high dependency on natural circumstances for cultivation of their crops, climate change negatively affects their ability to cope and reduces their overall resilience. It is a matter of life and death for these farmers to find suitable risk management strategies to deal with risks that are beyond their control. Crop insurance is one such measure which has emerged over the last two decades and could be helpful to small farmers. India is the country with the largest number of farmers insured under micro crop insurances. And although crop insurance has been integrated in national policies (i.e. WBCIS and NAIS), there are still large differences in understanding of these instruments, as well as dissatisfaction among farmers. This study has therefore looked at crop insurances from the perspective of the farmers themselves, with the following question being central to this research:

> *How can current crop insurances in India be improved to better suit the needs and wishes of small farmers?*

First of all, it needs to be emphasised that crop insurance alone is never a panacea for the problems small farmers are facing. An integrated risk management strategy is necessary to empower these farmers and build their resilience. However, crop insurance can play an important part in this, but only when it is tailor made according to the needs and wishes that are expressed by farmers themselves. The following conclusions can be drawn from the results sections of this thesis:

Conclusions case study 1: Nashik district, Maharashtra:

- The most understanding farmers are not necessarily the most (formally) educated or the ones with the largest owned land, nor the ones with the largest amount of assets. However, farmers with more knowledge and understanding of insurance have been exposed to insurance more than non-understanding farmers, and irrigate a larger percentage of their land (applying more agricultural techniques).
- The main risks to crop are excess and deficit rainfall, although hailstones also play an important role. However, the most severe perils are not the ones that occur every year. Farmers emphasise the need for pooling of risks through a community based insurance programme, the need for information provision from insurance companies, clear terms and conditions, timely payments, and a village level committee for verification of loss assessment.
- Coverage of weather perils is considered most important for farmers, and insured farmers want to be more involved in crop design as well as having voluntary coverage and both production and price risks covered under the insurance. Furthermore, farmers need to be able to opt for the aspects of insurance they find necessary for their crop cultivation.

Conclusions case study 2: Vellore district, Tamil Nadu

- On the majority of indicators (6 out of 9) the farmers were highly satisfied. These include the premium amount paid; insurance as risk strategy; association with fellow members in the community; inclusiveness; selection of members in assessment process; grievance redress mechanism. The fact that this particular insurance scheme was designed in consultation with

the farmers themselves and aspects such as premium amount paid were checked with the farmers before included in the insurance, could explain the satisfaction level of the farmers in the community-based scheme. Also, the democratic process in which farmers are chosen to represent their community on a higher level within the structure is likely to contribute to satisfaction of farmers and the feeling that they can redress their grievances and feel that they have (and had) influence on the insurance design.

- One of the main problems that was found among non-insured farmers, is their lack of awareness and understanding of the product design. Some of the farmers discontinued their insurance, as they expected their premium back at the end of the season, but did not receive a payment. These farmers then perceived insurance as being a gamble. This lack of understanding of the insurance product is problematic as this leads to exclusion of a very vulnerable group of farmers.

Although the farmers in the case studies (and small farmers in general) are extremely vulnerable and face serious threats to sustain their livelihoods, this does not take away the fact that there is also a lot of knowledge these farmers carry around about their crop cultivation, weather conditions, and agricultural inputs. Too often, the perspectives of these farmers are forgotten or ignored. Risk management strategies and instruments are created far away from their daily reality. One of the traits rural India possesses, is the great sense of community. It is a shame that most insurance companies design crop insurance without properly consulting farmers in every step of the process. By not involving small farmers, and not empowering the community they are part of, there is no way these insurances will be sustainable or beneficial for these farmers in the long run. By investing in the community, instead of taking resources out of the community, farmers and their villages can actually be made more resilient. Only then can crop insurance start to make a difference in the lives of small farmers in India.

This research can serve as a case study to learn from for other developing countries around the world. Although climatic or political circumstances can differ, the very basis of these farmers is the same: they are dependent on weather conditions for their harvest and thus extremely vulnerable for climate change. Listening to their perspective should be priority in designing any policy or risk management instrument. The following recommendations can be used to better suit the needs and wishes of small farmers with regards to crop insurances:

Policy & insurance recommendations

I. **Awareness campaigns** custom made for farmers never exposed to insurance before. Innovative ideas can be to work with games to let farmers understand the process of insurance, as well as working with community groups and icons (instead of information brochures) to make sure also illiterate farmers gain understanding of the product before taking up crop insurance.

II. **Involving farmers in product design** is one of the most important steps to guarantee that their needs and wishes are actually served through the crop insurance instrument. This involves understanding the risks these farmers face, the perils they want to have covered, but also the implementation process. Understanding needs and wishes of small farmers should be done at a community level, using community leaders and progressive farmers,

which are trusted within the community (rather than only using outsiders from the insurance company).

III. **Risk pooling through community based insurance structure** makes sure the insurance is more accessible for all types of farmers, while at the same time empowering the community to insure itself against perils. Structures already in place (e.g. Gram Panchayat or Self-Help Groups) can be used to set up insurance committees in farmer communities.

Further research:

I. **Insurance design: combining community and area insurance?**

In general, insured farmers under the community structure were satisfied on most aspects of their groundnut insurance. However, the fact that the assessment process works on an individual yield assessment basis, results in delays in claim payment. One of the recommendations therefore is that a combination of the community structure and an index insurance (with an automatic trigger) could be desirable to reduce the dissatisfaction on number of days to claim payments but still use the advantages of the community structure (e.g. pooling of risks & community empowerment). Further research into this aspect is necessary.

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II. **Integrated risk management strategy: find the best mix of tools!**

Insurance alone is not enough. Crop insurance needs to be part of an integrated risk management approach towards climate change. Not only do smallholder farmers need financial instruments to stabilise income, risk prevention and risk reduction together with risk finance are necessary to increase their resilience. Which tools, instruments and strategies work best for small farmers around the world, need to be further analysed in a location specific context.

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Appendix

Appendix 1: Key concepts

Adaptation

'[..] *adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.*' (IPCC, 2007, p.869).

Adaptive capacity

'[..] *those characteristics of an individual, household, or population group which enable it to alter or structurally reorganize its activities to diminish present threats to survival while enhancing its ability to address new risks*.' (Eakin, 2005, p.1924)

Adverse selection

Information asymmetry, where potential insured hide information about their risk from insurers, which leads to false assessments and premia (Barrett et al. 2007).

Climate change

'[..] *change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods*.' (UNFCCC, 2013)

Formal risk management strategies

'[..]*market-based activities and publicly provided mechanisms.'* (The World bank, 2001, p.140)

Informal risk management strategies

'[..]*arrangements that involve individuals or households or such groups as communities or villages*[..]*'* (The World Bank, 2001, p.140)

Marginal farmer

Marginal farmers are those who cultivate less than one hectare of land (FAO,2010)

Micro insurance

'The protection of low income households against specific perils in exchange for premium payments proportionate to the likelihood and cost of the risk involved.' (CGAP in NABARD, 2008, p.96).

Mitigation

'*an anthropogenic intervention to reduce the anthropogenic forcing of the climate system, which includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks*' (IPCC, 2007, p.878).

Moral hazard

This occurs when insured resort to actions that increase their exposure to the risk they have insurance for, thus exceeding the risk exposure that was estimated when the premium was established, leaving the insurer with a higher risk (Barrett et al. 2007; Davies et al.2009).

Small farmer

Farmers who cultivate between one and two hectares of land are considered small farmers (FAO, 2010).

Sustainable livelihood

'A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term.' (Chambers and Conway, 1992, p.6).

Resilience to climate change

'[..]*having the ability to plan for, survive, recover from and even thrive in changing climatic conditions.'* (ECA, 2009 in Lasco et al. 2011)

Vulnerability to climate change

'[..]*the degree of susceptibility to harm, damage or loss as a result of climate change impacts or events.'* (IPCC, 2001 in Lasco et al. 2011)

Appendix 2: literature review overview

Title, Author & Institution		Objective (& type of insurance)	Main observations	Conclusions	Scope for future research
How Does Risk Management Influence Production Decisions? Evidence from a Field Experiment	Cole,S., Giné, X., Vickery, J. Harvard Business School 2013	Study how insurance provision influences production decisions (relative to a control group)	Insurance provision has little effect on total **agricultural investments**, but causes significant shifts in the composition of those investments Uptake of insurance is lower for **uneducated farmers**, due to lack of trust or understanding of the product	Improved availability of ex post insurance against production risk will lead to **greater ex ante investment** in riskier production activity Increased ownership of the risk management instrument leads farmers to select a **portfolio with higher expected returns**	Long-term effect on total agricultural expenditures Behavioural effects after insurance payouts
Climate Variability and the Role of Access to Crop Insurance as a Social-Protection Measure: Insights from India	Panda, A. International Rice Research Institute 2013	Examining the merits of crop insurance in adapting to climate change **Weather index based insurance & NAIS**	**Problems area-yield crop insurance**: basis risk; delay in settlement indemnities; large manpower costs; regional and crop bias in coverage **Problems index insurance**: lack of real time weather data; low coverage in terms of farmers; delay in payment indemnities ; lack of different involvement stakeholders	**Lack of awareness** and the complicated process of agricultural insurance are major obstacle s in take-up of insurance among small and marginal farmers Crop insurance may **undermine the sustainability of local adaptation measures** by encouraging the cultivation of cash crops such as cotton instead of climate-resistant crops	Role of subsidies for certain crops in leading to reduced cultivation of traditional (more climate resistant) varieties Role of insurance in 'maladaptative 'behaviour of farmers

Crop Insurance: An Empirical Study on Awareness and Perceptions	Soni, B.K., Trivedi, J. 2013	Understanding the existing scenario of crop insurance in India, specifically in Gujarat; empirically checking the **awareness levels of farmers** and reasons for not availing crop insurance in Anand district. **NAIS**	Farmers prefer to have **cash reserves and savings** as compared to insurance Crop insurance spreads the crop losses over space and time, provides **social security** to farmers, helps in maintaining their dignity, offers **self-help**, encourages large **investment**s in agriculture for improving crop yield and **increasing agricultural production**	There is a need for continuous **interaction between all stakeholders** (farmers, banks, government) to make implementation of NAIS more successful Crop insurance design at the village level should be simple with **user friendly policies** so farmers understand the product	Role of SHGs in spreading awareness and better penetration of crop insurance
Weather Based Crop Insurance Scheme, India	Cappiello, S.F., Cooper, P., Rao, K.N. CGIAR CCAFS 2012	Provide background information on WBCIS and NAIS, and draw on the lessons learned from WBCIS. **WBCIS & NAIS**	**NAIS critique**: potential open-ended liabilities for government; major delays in claim payment; inefficiency in crop yield estimation; moral hazard. **WBCIS alternative** to NAIS, but: basis risk; infrastructure (weather stations) need to be improved; reliance on historical data (risk of under-pricing); difficult to find skilled personal.	Affordable availability of weather index insurance is beneficial **enhancing risk taking capacity** of risk prone farmers; **Premia** of weather index insurances are likely to go up (due to the severity and frequency of adverse weather events	How to reduce basis risk? ➔ Design more realistic index in terms of crop loss? Majority of WBCIS farmers still borrowing farmers: awareness raising among non-borrowing farmers?

Weather Based Crop Insurance in India	Clarke, D., Mahul, O., Rao, K., Verma, N. 2012	Providing an overview of the market for weather index insurance in India and making suggestions for future research and innovations **WBCIS**	**Advantages weather insurance**: lower moral hazard and adverse selection; quicker claim settlement **Main challenge weather insurance**: imperfect correlation between the index and farmer's loss (basis risk) If index insurance cannot be relied upon to make claim **payments in very bad years**, product will be most unattractive to risk averse farmers	**Consumer protection** legislation for indexed insurance products should be enhanced by government Current market structure does not offer **appropriate incentives** to insurers to invest in developing improved products since innovations can be copied from other insurers	Comparative statistical analysis of different products Further research to better understand how best to combine the information from different indices so that farmers can rely on timely payouts in bad years
Farmers Perception and Awareness about Crop Insurance in Karnataka	Goudappa, S.B., Reddy, B.S., Chandrashekhar, S.M. 2012	To study the socio-economic profile of Insured farmers; the perception and awareness of insurance; and farmer opinion on draw backs of insurance scheme **NAIS**	The majority of farmers (>80%) in the area was not aware who is the implementing agency and who pays compensation. Farmers suggested improvement of existing scheme: **quick settlement of claims**; insurance service at doorstep; **simplified procedure**; sufficient time for opting for insurance; **wide publicity for creating awareness**.	There is a need to establish a separate Crop Insurance Wing in Agriculture Department to overcome constraints of the scheme There is a need to create awareness about crop insurance by using crop **insurance agents at the village level**.	How to involve non-loanee farmers and create awareness among this group of farmers. The use of rural agents at village level in facilitating insurance services.

Crop Insurance in India Changes and Challenges	Nair, R. Agriculture Insurance Company of India 2010	Evaluation of NAIS and exploring the weather insurance alternative **NAIS & weather index insurance (WBCIS)**	**Insurance in Indian agriculture** is **challenging**: a large number of small and scattered landholdings; varying climatic and soil conditions; lack of basic data; variety of agricultural practices Biggest **disadvantage NAIS**: delayed claim settlement **Advantages weather insurance**: reducing costs (no field visits or yield estimation); moral hazard and adverse selection reduced **Problems weather insurance**: basis risk, high start-up costs	Basis risk can only be minimised if claims structures of weather insurance is worked out at **smaller unit levels** Farmers need to be made aware of the (highly technical and complicated) claim structures **Trust** would be higher if weather stations were government owned Index insurance and traditional insurance not **mutually exclusive**	Explore how yield insurance and weather insurance can be combined and work complimentary Possibility of having smaller unit levels of insurance structure (village panchayat)

Agricultural Insurance in India: Approaches and Challenges	Pal, D. & Modal, T. Indian Institute of Management 2010	Advocating a peril-indexed insurance as an alternative to the existing area approach credit-linked crop insurance scheme **Peril-indexed insurance & NAIS**	**Problems NAIS**: financial non-viability; delay in claim settlement; moral hazard; adverse selection; limited coverage; cross-subsidisation across states; crop loan insurance rather than crop insurance (due to linking to credit); only partial protection to farmer's income (only production risks are covered) **Suggestions for improvement NAIS**: reduction insurance unit; premium rate needs to cover pure risks, administrative costs and reasonable returns; wider coverage of pre-sowing and post-harvest loss; encouraging participation non-loanee farmers **Challenges weather insurance**: awareness and capacity building; availability of reliable data; additional weather stations	The **efficiency of rainfall** insurance can be enhanced through **risk packaging** and risk transfer by the primary insurer Weather index based insurance schemes would be **financial viable for insurer** by transferring his risk to the investors in the secondary capital market and elimination adverse selection and moral hazard while reducing administrative costs by using an objectively calculated index	Explore risk packing options further Rainfall bonds: transferring risk to the investors

Index based Crop Insurance	Rao, K.N. Agriculture Insurance Company of India 2010	Give an overview of the key advantages and challenges of different index insurance products in India **NAIS & rainfall (weather) based index insurance**	Agriculture not really fit for insurance due to **systemic and covariant risk** **Problems NAIS**: basis risk; delay in receiving yield estimates leading to delays in settlement of indemnities; non-coverage; lack of infrastructure and manpower **Advantages weather index**: faster payouts; contract is more transparent; transaction costs are lower; less susceptible for moral hazard **Challenges weather index**: non-availability of reliable and quality weather data, basis risk, complex index contract design	Index based insurance is the **way forward in developing nations** Developing countries often lack historical yield data, but have **historical rainfall data** to be used in rainfall index Best results can be achieved by careful index design and **combination of indices** (multiple triggers)	Satellite imagery based yield index Use of multiple triggers to capture production risk in agriculture
Patterns of Rainfall Insurance in Rural India	Giné, X., Townsend,R., Vickery, J. International Bank for Reconstruction and Development (The World Bank) 2008	Describing an innovative rainfall insurance product offered to smallholder farmers in Andhra Pradesh, India **Rainfall index insurance**	**Take-up of rainfall insurance** decreases with basis risk, increases with household wealth, and decreases with binding credit constraints Index insurance is transparent and inexpensive, enables quick payouts, minimises moral hazard and adverse selection	**Lack of understanding** most important reason for not taking up insurance **Risk averse households** are less likely to purchase insurance (if unfamiliar with insurance vendor) **Insurance innovations**: Combining insurance with short-term loan; promptly payouts by using automatic rain gauges network	Determining the causal effect of rainfall insurance on income and consumption smoothing Price elasticity of demand for insurance The interaction between rainfall insurance and other risk-bearing mechanisms The pattern of diffusion of insurance participation over time

Agricultural Insurance in India: Problem and Prospects	Raju, S. S. and R. Chand National Centre for Agricultural Economics and Policy Research 2008	Examining the performance of NAIS; exploring the problems and prospects of agricultural insurance in India; look into the role of the government in implementing insurance schemes; suggest effective insurance programme **NAIS & WBCIS**	The availability of formal instrument for diffusion of risk (e.g. crop insurance) will facilitate farmers to adopt **risky but remunerative technology and farm activities**, resulting in increased income. **Individual insurance**: accurate and timely compensation, but high administrative costs. **Weather index insurance**: timely compensation based on (transparent) weather index, but poor density of weather stations **NAIS**: combines individual approach (for widespread calamities) with individual approach (for localised calamities).	**Risk in farm income** is higher than risk in area, production and prices. This underscores the need for addressing risk in farm income by devising area specific crop insurance or other suitable mechanisms (p.22). **Lowering insurance unit** to Gram Panchayat would reflect yield loss at a reasonable level.	Pilot studies to build effective communication models are needed to increase participation of non-loanee farmers. Explore the options of increasing private sector participation (e.g. through public-private partnerships).
Hot Stuff: Index Insurance for Indian Smallholder Pepper Growers	Zant, W. 2008	Stimulate and quantify potential welfare benefits of crop index insurance on the basis of a small panel data set of typical cash crop growing households **Joint price & yield index insurance**	Index based insurance can overcome the **asymmetric information problems** and deal with covariance of risk A common reason for insurance market failure is **lack of effective legal systems** to enforce insurance contracts The larger the **sensitivity of a farmer** the larger the potential risk reduction achieved through area-yield index insurance	**Optimal crop revenue insurance** depends on the gross revenue index, the price index, and the yield index The impact of feasible price index insurance and feasible production index independently is moderate **Basis risk** is shown to increase with risk aversion and with premium rates	Combining different index insurances

Scaling up Microinsurance: The Case of Weather Insurance for Smallholders in India	Manuamorn, O. P. 2007	Study the scaling up of BASIX's weather insurance program **Weather index insurance**	**Advantages index based insurance**: reduced moral hazard and adverse selection; lower administrative costs; standardised and transparent structure; availability and negotiability; reinsurance function; versatility (bundling with other financial services) **Challenges index based insurance**: basis risk; precise actuarial modelling; education; market size; weather cycles; microclimates; forecasts	From a development perspective, it is important to distribute weather insurance as a whole **package of livelihood enhancement products** There is need for investment in network of weather stations throughout the country	
Weather Insurance in Semi-Arid India	Lilleor, H.B., Giné, X., Townsend,R., Vickery, J. 2005	Literature review on insurance, risk sharing and consumption smoothing and providing a case study of weather insurance **Rainfall insurance in Andhra Pradesh**	Farmers apply a range of risk management strategies, both **income smoothing** (ex ante) and **consumption smoothing** (ex post), In semi-arid India households often have to rely on income smoothing in the case of idiosyncratic (weather) shocks) The demand for insurance depends on individual **farmer's WTP** and the correlation between actual payouts and economic losses from adverse weather events	The **choice of motivator** in villages can be crucial for take-up: progressive farmers and SHGs are important entry-points Substituting crop insurance with weather insurance will introduce a more **efficient and low cost** scheme for the government, and a more **transparent and actuary product** for farmer	Role of motivator in take-up Farmer's WTP Role and effectiveness of marketing in villages Farmer's awareness related to take-up of insurance

Innovative Financial Services for Rural India: Monsoon-Indexed Lending and Insurance for Smallholders	Hess, U. The World Bank 2003	Outlining an integrated crop loan insurance and risk management product for Indian finance and agriculture **Monsoon index insurance**	The proposed scheme seeks to **transfer systemic risk** out of the farmer-bank relationship into insurance markets Proposed scheme is combination of: **monsoon index insurance**; a **risk management account**; weather risk **reinsurance**; a **smart card**	The crop loan insurance scheme helps banks to increase their **lending volumes**; bring down default rates and **transaction costs**; help farmers **stabilise their income** and **access greater credit** (due to enhanced collateral)	Testing the proposed insurance loan scheme in combination with other risk management strategies and techniques
Attitudes Towards Risk: Experimental Measurement in Rural India	Binswanger, H.P. 1980	Study risk attitudes of farming households through interviews and experimental gambling approach.	Differences in investment behaviour observed among farmers facing similar technologies and risks cannot be explained primarily by **differences in their attitudes** but would have to be explained by **differences in their constraint sets**, such as access to credit, marketing, extension, etc.	Policies are needed that are geared towards **removing external constraints instead of being risk-specific**.	Explore policies that remove external constraints for farmers

Appendix 3: Field survey Maharashtra

Socio-Economic Profile of the Respondent

1. **Name:** ……..

2. **Father's /Husband's Name:** …….

3. **Age (in years):** ☐☐

4. **Gender** *(**Code:** Male-1, Female-2)* ☐

5. **Social Category:** *(**Code:** SC-1, ST-2, OBC-3, General-4)* ☐

6. **Level of Education :** ☐
   *[**Code:** Lower than Class 5 - 0, Class 5 to Class X -1, Class XI to XII – 2; Graduate – 3; Postgraduate & Higher – 4]*

7. **Farmers' Category :** ☐
   *[**Code-** Marginal Farmer (upto 2.5 acres)-1, Small Farmer (2.5-5 acres)-2, Medium (5-12.5 acres)-3, Large Farmer (above 12.5 acres)-4]*

8. **Land holding** *(in acres)*

	Irrigated	**Un-irrigated**	**Total**
8a.Total land holding: (owned land)	☐☐.☐☐	☐☐.☐☐	☐☐.☐☐
8b.Leased land, *If any*	☐☐.☐☐	☐☐.☐☐	☐☐.☐☐
8c. Total	☐☐.☐☐	☐☐.☐☐	☐☐.☐☐

9. **Two main sources of Irrigation** ☐☐
   *[**Code**: Rain-fed – 1; Canal / River – 2; Wells/Tube-wells-3; Tanks-4; Ponds / Reservoir – 5; Others - 6 (Pl. specify_____)]*

10. Landline: ☐☐☐☐☐ ☐☐☐☐☐☐☐

    Mobile: ☐☐☐☐☐☐☐☐☐☐

Name of Investigator: - …….

Signature : - …….

1: Awareness level of Farmer

a. Please share your knowledge of the following agricultural techniques?

	Have you heard of it? (Y=0; N=1)	Do you use/apply it? (Y=0; N=1)	Briefly explain the concept:
a. Soil Testing (Testing of soil for understanding soil properties, availability of nutrients in soil etc.)			
b. Seed Treatment (Stands for treating seeds with chemicals before sowing to protect infection/ diseases)			
c. Sprinkler / Drip Irrigation (Mechanized method of irrigation that saves water and allows for judicious application of water)			
d. Organic Farming / Certification (Cultivation practice without use of chemical fertilizers, pesticides and other chemicals, involves application of manures and biological pest control)			
e. SMS-based Market / Weather Advisory (Advisory services such as market information over phone, weather forecast and advisory for agricultural practices to be adopted as per the forecast)			

b. General Understanding of Insurance

a. Have you heard of insurance? (Y=0; N=1) ☐

	1. Life Insurance	2. Motor Insurance	3. Health / Medical / Hospital Insurance	4. Livestock / Asset / Crop Insurance
b. What types of insurance do you know of? (Y=0; N=1)				
c. Do you have any of these insurance? (Y=0; N=1)				

d. How does life insurance differ from other types of insurance listed above?

(***For Interviewer:*** *Life insurance pays out insured amount in the event of death of the insured. Life insurance is normally for longer coverage period (more than a single year) and requires premium payment at regular intervals. Life insurance is used by people as a savings product and the premium paid is returned with some bonus on survival of insured person. Scope for fraud and moral hazard is lesser in life insurance and is easier to verify. Other types of insurance compensate the insured in the event of losses/ damages due to insured event. Usually the coverage period for other type of insurance is one year only and chances for moral hazard or fraud are very high. Claim verification process involves loss estimation and is a complex process).*

e. Can you highlight the three most important characteristics / attributes of insurance?

1. _____

   _____

2. _____

   _____

3. _____

   _____

*(**For Interviewer:** Imp. attributes of insurance are: (a) **Pooling of risks** from a larger population to compensate for losses of few, (b) **Compensating only for actual losses** occurred due to the risk event insured against (i.e. **indemnify the insured**), (c) **Insurable interest:** Person opting for insurance must have monetary interest in the property he is insuring and risk event will lead to monetary loss to the insured, (d) **Insurance is different from savings/ investment/ credit and (e) Insurance does not brings in any inflows from outside, rather redistributes money across contributors and across time**).*

1.3 Awareness and Understanding of Crop Loans and Crop Insurance

a. Do you avail crop / agricultural loan from any bank? (Y=0; N=1) ☐

b. If yes, from which bank (name): _____

c. Rate of interest (% p.a.) applicable if you repay your crop loan on time ☐

d. Do you have a Kisan Credit Card (KCC)? (Y=0; N=1) ☐

e. If yes, what is the limit of your KCC (in Rupees)? ☐

f. Has your bank ever made a deduction from your crop loan towards crop insurance? (Y=0; N=1) ☐

g. Are you aware that crop insurance is mandatory with crop loans provided by banks? (Y=0; N=1)

h. How, according to you, can crop insurance become relevant for farmers in India?

i. Which of the following assets do you/ your family have at present? Tick the applicable ones

a. Mobile Phone		f. Motorcycle/Scooter	
b. Four-Wheeler/Tractor		g. Color Television	
c. Dish TV / Cable TV / Set-top Box		h. Refrigerator / Fridge	
d. LPG Gas Stove / Cylinder		i. Inverter / Solar Panel	

2: Farmer categorisation (for interviewer)

Based on the information provided by respondents to the questions in previous section, the respondent farmers need to be categorized into 3 categories. To categorise farmers, firstly complete the following questions based on farmers' responses and then categorise them in the matrix given below:

2.1 Agricultural understanding

How many techniques answered correctly (tick the one that applies)? (*Refer to Question 1.1: Please share your knowledge of the following agricultural techniques?)*

1. Farmer describes less than 2 (0-1) techniques correctly, **Has difficulty explaining the concepts.** ☐
2. Farmer describes 2-3 techniques correctly ☐
3. Farmer describes more than 3 (4-5) techniques correctly, **Has little trouble elaborating on the use of the techniques.** ☐

2.2 Insurance understanding

1.2e How does life insurance differ from other types of insurance?

1. Does not understand difference ☐
2. Can describe difference ☐
3. Can describe difference and also highlight characteristics of insurance ***(1.2f)*** ☐

1.3g Are you aware that crop insurance is mandatory with crop loans provided by banks?

1. Not aware at all ☐
2. Aware about mandatory crop insurance ☐
3. Aware about mandatory crop insurance ☐

2.3 Categorisation

Category 1: Farmer has **very little understanding** of agricultural techniques; does not grasp the concept of insurance; and cannot articulate the functioning of crop insurance. **Most of the responses in 1st box.**

Category 2: Farmer has **basic understanding** of agricultural techniques; understands only the basic concept of insurance; and can articulate the functioning of crop insurance in very general terms. **Most of the responses in 2nd box for above mentioned questions.**

Category 3: Farmer has **reasonable to good understanding** of agricultural techniques (and applies these himself as well); understands the concept of insurance (and can explain this); and can articulate the functioning of crop insurance in more detail. **All responses in the 3rd box for the above questions.** Such farmer may also own assets such as mobile phone, refrigerator, colour television or four-wheeler.

Tick the one that applies:

Very little understanding (1)	Basic Understanding (2)	Fair Understanding (3)

3: Risks and risk management

(Applicable to both Category 1 and Category 2 farmers)

3.1 Profiling of key risks in agriculture

Risks in Agriculture	**How often do you experience this risk?** (0 = almost every year; 1 = every 1-3 years; 2 = every 3-5 years; 3 = every 5-7 years; 4 = every 7- 10 years; 5 = > every 10 years; 6 = Never)	**Severity risk** 0 = negligible / minor crop loss; 1= small but significant crop loss; 2 = medium crop loss; 3 = high crop loss; 4 = complete crop loss	**Rate (1-100) Importance for risk mitigation**	
			Downward	**Upward**
a. Poor quality and lack of timely access of inputs				
b. Lack of labour supply				
c. Loss from Stray / Wild Animals				
d. Unseasonal rain				
e. Excess Rainfall				
f. Drought / Deficient Rainfall				
g. Hailstorm				
h. High Winds / Storms				
i. Adverse Price Movements				
j. Loss from wastage / quality deterioration				
k. Credit interlocking				
l. Pests and diseases				
m. Dew/ Fog				

a. What are the different ways/ methods you use for estimating your losses on account of the following perils?

Weather Parameter	**Peril/ risks**	**Loss estimation method**
a. Rainfall	1. Drought / Deficient Rainfall	

	2. Excess / Unseasonal Rainfall	
b. Other Weather Elements / Events	1. High temperature	
	2. High humidity	
	3. Frost	
	4. Fog/ Dew/ Mist	
	5. High Winds	
	6. Hailstorms	
d. Others	1. Pests and diseases	
	2. Damage by wild/ stray animals	

3.3 Based on your experiences during the last 5-10 years, please share with us your views about the changes in the following weather parameters.

Weather Parameter	**Type of Change**	**No Change**	**Decrease**	**Increase**	**Degree of Change (H/M/L)***	**Effect on your Farming and Risk Mitigation Strategies** *(Link this with change in weather parameter- rainfall, temp. etc. in general and not specific aspects)*
a. Rainfall	1.No. of Rainy Days					
	2.Seasonal Rainfall Volume					
	3.Length of Dry Spells					
	4.Incidence of Unseasonal Rains					
	5.No. of High Rainfall Days					
	6.Hailstorm					
b. Temperature	1.Minimum Temperature					
	2.Maximum Temperature					
	3.Average Temperature					
	4.Days of Low Temperature / Frost					
	5.Days of High Temperature					
	6.Extremity / Range of Temperature					
c. High speed Winds / Storms	1.Frequency of High speed Winds / Storms / Cyclones					
d. Others, specify:						

***(H/M/L) ~ High/Medium/Low**

(Following questions are applicable only to the ***Category 2*** farmers)

3.4 Have you heard about crop insurance that is based on crop yields estimated through crop cutting? *(**Code:** Yes-0, No-1)* ☐

3.5 Have you heard about the crop insurance based on weather data? ☐
*(**Code:** Yes-0, No-1)*

3.6 Can you name some insurance companies providing crop insurance?

1. _____
2. _____
3. _____

3.7 What number of claim payouts do you consider ideal during 10 seasons of crop insurance coverage? (Code: One to Three-1, Four to Six-2, Six and above-3)
*a. (**Code:** Yes-0, No-1)* ☐

b. Reason for your opinion:

3.8 Will you buy a crop insurance policy if it does not yield payouts in the first 2-3 seasons of coverage? ☐
*a. (**Code:** Yes-0, No-1)*

b. Reason for your opinion:

a. Basic inputs for crop insurance

		Select the Preferred Option from each Group
a. Risks covered	1. Weather	
	2. Pests / Diseases	
	3. Price / Market	
	4. Loss from Animals / Theft	
b. Peril coverage	1. Named Perils	
	2. All Perils	
	3. High-Intensity Loss Events	
c. Loss assessment method	1. Individual Assessment	
	2. Group-based	
	3. Village-based	

4: Applicable to Category 3 farmers only:

(Fair/ good understanding of crop insurance)

4.1 Please provide the following information related to your crop production in recent years

	Recent Season	Last Season	Last 5 Years
a. Crop (Specify Main Crop)			
b. Yield for your farm(s) (Kg/Acre)			
c. Contribution to annual income (in %)			
d. Average Yield in your village (Kg/Acre)			
e. Major Cause of External Losses in your farm(s)*			
f. % Reduction in your Yield			
g. Major Cause of External Losses in field of your neighbor*			
h. % Reduction in yield of your neighbor			
i. Major Cause of External Losses in your village*			
j. % of Farmers suffering Major Losses in your Village			

*****(Deficient Rainfall / Dry Spell – 1; Unseasonal Rainfall – 2; Excess Rainfall / Floods – 3; Extreme / High Temperature – 4; Low Temperature / Frost – 5; Pests & Diseases – 6; Hailstorm – 7; Fog / Dew – 8; Storms / High Winds – 9; Wild / Stray Animals – 10; Others – 11)

4.2 Loss assessment

a. How do you judge when rainfall is sufficient for planting?

b. How do you assess your yield/ loss in yield in a bad crop year?
*(**For interviewer:** based on experience/as suggested by other farmers/ inspection of field, based on weather pattern etc.)*

c. In any crop season, on what basis do you set your target yield?

d. Do you think your target yield for any crop is similar to yield expectation of your neighbouring or other fellow farmers for the same crop? (Yes=0, No=1)

Reason for your opinion

e. Are your losses similar to losses of other farmers in the village? (Yes=0, No=1)

f. If not, then are such losses on account of risks related to/ specific to you only, and how do you identify the causes of those losses?
*(**For interviewer:** Such as location of farm, slope of farm, type of soil, type of seed sown etc.)*

g. In your view, what can be done to mitigate losses on account of risks related to/ specific to you only?

i. Do you think that all risks which cause loss to crops can be controlled by farmers? (Yes=0, No=1)

If no, then what are the risks that you believe cannot be controlled by farmers?

l. What is the extent of uncontrollable losses experienced by you, even after using risk mitigation measures for uncontrollable risks?

What, according to you, can be the options to deal with uncontrollable risks?

the control of farmers? (Yes=0, No=1)

b. If a village level insurance program is to be implemented, what are the important steps for developing such a program? *(**For interviewer:** Pooling of risk, crop monitoring etc.)*

c. What kind of claim intimation, loss assessment and settlement mechanisms do you envisage for crop insurance programs? *(**For interviewer:** institutional mechanism, community model etc.)*

d. What should be basis for calculating the sum assured under the proposed insurance *(Expected Value of Production = 1, Cost of Cultivation = 2, Cost of Cultivation plus Some Return = 3, Other = 4)* ☐

Specify (Other)……

……....

e. What should be the basis for arriving at the premium for crop insurance? *(**For interviewer:** Affordable Contributions; Historical Loss Experience from Insured Perils etc.)*

f. What is the best suited mechanism for monitoring and assessment of losses under the insurance program?
(Self-reporting by farmer=1, Community monitoring and assessment=2, Farm visit for verification=3, Triggers based on weather data= 4, Satellite=5, Others= 6) ☐

g. What is the most optimal unit of insurance which is best suited for you/ other farmers? ☐
(Individual Farm level = 1, Farmer Group-level = 2, Village Level = 3, Gram Panchayat level=4, Mandal / Hobli / Taluka / Block level = 5, Others = 6)

Specify (Other)……

……....

h. In case of frequent, widespread losses on account of insured perils, how would you ensure that insurance continues to be relevant to farmers by providing expected benefits?

i. Going by the situation in previous question, what, according to you, is the role of insurance companies, particularly with respect to crop insurance?

4.4 Out of the options given below, rank the following features of crop insurance based on their appeal?

(Tick the one the farmer prefers over others and ask why)

Crop Insurance Features	**Rating (Out of 100)**	**Reason for preference**
7. Premium-Refund based Multi-year Policy (Single Crop Insurance Policy providing coverage for Multiple Years and Returning Premiums in case of No Claims)		
8. Community / Group-based Loss Assessment and Claim Redistribution (Community to be responsible for assessment of crop losses from insured perils and also for redistribution of claim amount received from insurance)		
9. Revenue / Income Insurance (Crop Insurance that takes into account both production and price risks)		
10. Voluntary Coverage under Crop Insurance		
11. Active / Higher Involvement in Design of Crop Insurance		
12. Insurance for losses that arise from unseasonal rains, hailstorms etc. after harvest		

Appendix 4: Calculations satisfaction index

Indicator	Satisfied	Neutral	Dissatisfied		Weighted Score	Average Score
	A	B	C	D=(A+B+C)	E=(3XA)+(2XB)+(1XC)	E/D
	Number of Farmers	Number of Farmers	Number of Farmers	Total Number of Farmers[13]		
Premium Amount Paid	83 76.85%	11 10.19%	14 12.96%	108	**285**	**2.6**
No. of days to claim Payment	43 39.45%	30 27.52%	36 33.03%	109	**225**	**2.1**
Yield Assessment Process	74 68.52%	19 17.59%	15 13.89%	108	**275**	**2.5**
Insurance as Risk Strategy	99 90.00%	4 3.64%	7 6.36%	110	**312**	**2.8**
Level of benefit payment	44 40.00%	18 16.36%	48 43.64%	110	**216**	**2.0**
Association with fellow members in the community	97 89.81%	10 9.26%	1 0.93%	108	**312**	**2.9**
Way in which members were included in product design (Inclusiveness)	82 76.64%	15 14.02%	10 9.35%	107	**286**	**2.7**
Selection of members in assessment process	94 86.24%	8 7.34%	7 6.42%	109	**305**	**2.8**
Grievance Redress Mechanism	84 77.78%	8 7.41%	16 14.81%	108	**284**	**2.6**

[13] Differences in number of farmers can be explained by the fact that some farmers withheld giving their preference to some of the indicators.